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ABSTRACT

The part-time job market now employs about 12.5 million persons who are voluntary part timers--those who customarily work one to thirty-four hours a week on their own volition. Data from the Current Population Survey (March-May, 1973) was used to examine the cross-sectional distribution of the employment and wages of part timers, and an analysis was done to determine the principal factors of supply and demand. An intersectoral model of the supply and demand of part timers was used (process of which is described in this report) to explore interactions between differences in the reward to part timers and in the utilization of part timers. Findings include that part timers are paid much less than full timers, due primarily to the employment of part-time workers in low wage sectors of the economy. The statistical analysis supported the view that there is a large market for part timers, which serves both the economy and the marginal members of the work force. However, employers are generally unwilling to train or promote part timers and those with high level credentials are usually barred from upward mobility. Conclusions and policy implications included that the part-time labor market serves a very useful purpose in providing jobs for millions of persons who might not otherwise find employment, and since the part-time market is very diverse, regulating it by means of quotas as advocated by some federal and private sectors would be a rather inefficient proposition. (BL)

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An Empirical Analysis of the Voluntary Part-Time Labor Market

by

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16. Abstracts

"An Empirical Analysis of the Voluntary Part-time Labor Market" analyzes the cross-sectional demand and supply of part-time workers, using data from the March-May, 1973 Current Population Survey. These data indicate that part-timers are paid much less than full-timers. But wages among part-time workers vary as sharply on the basis of education and experience as they do among full-timers.

A supply and demand analysis of the distribution by sector of part-time employment indicate that where part-timers were relatively cheap, employers were much more likely to hire them. Other demand-side factors favoring employment of part-timers were a need for employees at irregular work times and a dearth of training and promotion opportunities (as indicated by a relatively low wage level). On the supply side, the proportion in the sectoral work force of groups with a generally low level labor force participation (for example, young people or mothers of small children) was positively correlated with the proportion of part-time jobs in the sector.

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Summary of "An Empirical Analysis of the Voluntary Part-Time Labor Market"

"An Empirical Analysis of the Voluntary Part-Time Labor Market" analyzes the cross-sectional demand and supply of part-time workers. There has been considerable interest in the growing market for voluntary part-time employees -- those who customarily work 1-34 hours a week, on their own volition. Yet very little quantitative analysis of this market is available. The present study analyzes this market by using data from the March-May, 1973 Current Population Survey to examine the cross-sectional distribution of the employment and wages of part-timers.

These data indicate that part-timers are paid much less than full-timers. This difference is not due to differences in the characteristics of part-timers. The two groups are broadly similar in educational attainment. Moreover, within the part-time group, wages vary as sharply on the basis of education and experience as they do among full-timers (although there is some evidence of diminishing returns at the highest levels of education and experience). Yet a part-time worker will earn substantially less than a full-timer with the same sex, race, education and age.

A large part of this difference is due to the employment of part-time workers in low wage sectors of the economy. When the data were divided into two hundred industry-occupation categories, about two-thirds of the part-time/full-time wage difference was seen to be associated with differences in the sectoral distribution of the two groups.

A supply and demand analysis of the distribution by sector of part-time employment was carried out. The principal demand factors were the employers' need for part-timers and the relative cost of part and full-timers. The results indicated that where part-timers were relatively cheap, employers were much more likely to hire them. Other demand-side factors favoring employment of part-timers were a need for employees at irregular work times and a dearth of training and promotion opportunities (as indicated by a relatively low wage level).

On the supply side, the proportion in the sectoral work force of groups with a generally low level labor force participation (for example, young people or mothers of small children) was positively correlated with the proportion of part-time jobs in the sector. Since this result was obtained even when the demographic composition of the full-time labor force is used as a predictor variable, these data support the view that employers do tend to create part-time jobs where there is employee demand for them.

In general, the statistical analysis supported the view that there is a large market for part-timers, which serves both the economy and the marginal member of the work force.

However, the results are consistent with the hypothesis that employers are generally unwilling to train or to promote part-timers. As a result, poorly educated, inexperienced part-timers have the worst prospects in the market. On the other hand, part-timers with a high level of credentials are still barred from upward mobility paths that would put them in the highest range of the earnings distribution.

While the principal purpose of this work was to carry out some basic, empirical analysis of the part-time job market, rather than to develop new

directions for policy, some obvious implications do seem to emerge from this work. Thus, the diversity and complexity of the part-time job market observed here underlines the inefficiency of any effort that might be made to initiate changes by imposing fixed quotas on the different sectors of the economy. At the same time, the responsiveness of part-time employment in many sectors to changes in the employer's costs of hiring these workers suggests that modification of the way in which the use of part-timers affects employers' contributions to unemployment insurance, social security, and other pension schemes, and other fringe benefits could have a significant impact on their employment.

An Empirical Analysis of the Voluntary
Part-Time Labor Market

I. Introduction

The part-time job market now employs over 16 million Americans. Of these, about 12.5 million are voluntary part-timers. (The remainder work part-time because they cannot obtain full-time work.)

Moreover, the proportion of workers voluntarily employed part-time has increased over the past two decades, from one out of twelve workers in 1957 to one out of seven in 1976.[1]

But despite the large and growing segment of the labor force which is employed part-time, relatively little empirical work has been done in this area. Moreover, while there have been several very useful qualitative studies, there has been very little econometric analysis of the part-time labor market.[2] This report presents the results of some empirical research on part-time work. Econometric studies of other aspects of the part-time labor market by Wigner[3] and Jones and Long[4] are now in progress.

The quantitative study in the present effort was carried out in the context of a framework of analysis which responds to several types of

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[1] Employment and Training Report of the President, various issues.

[2] See Hallaire for a very useful discussion of European experience with part-time employment. See Nollen, Eddy, and Martin and the references cited there, for qualitative studies of part-time employment in the United States.

[3] Martha Wigner, economics department, University of Chicago.

[4] Ethel B. Jones and James E. Long, "Women and Part-Week Work." See also Smith and Morgenstern and Hamovitch.

questions about the part-time labor market. The growth of part-time jobs might be seen as a means of creating more leisure time, by reducing hours of work; as a source of unemployment among the full-time labor force, as part-timers displace full-timers; as a source of employment for women, students, and older people, facilitating their participation in the labor force; and as a source of labor for employers, and, indirectly, of needed services to consumers.

The detailed statistical work presented here has more direct relevance to the narrower concerns in the third, and especially the fourth questions. But it also provides information that has a bearing on the resolution of the broad issues raised by the first two questions.

II. Statement of the Problem

A. The Relationship Between the Historic Downward Movement in Hours of Work and the Growth of Part-Time Employment.

From the mid-nineteenth century to the nineteen-thirties of this century, hours of work fell by some twenty or thirty hours to the present standard of about forty hours. A careful study of trends since the late nineteenth century indicates that although progress was more rapid in some decades than in others the movement to shorter hours was more or less continuous over this period.[1]

But there has been no equivalent trend in hours in recent decades. In fact, the data[2] indicate no decline whatsoever in the weekly hours of adult males since the mid-nineteen thirties. (Even if we discount the levels of hours during the depressed nineteen-thirties, and use as our base the full-employment years of the late nineteen-forties, no net change in hours is observed since that time.)

However, the proportion of the work force in part-time jobs in this same period has increased. At first glance, this movement appears to reject the conclusion that hours have levelled off -- to indicate instead a vigorous continuation of the historical downward trend in hours worked. But a closer analysis points to a somewhat different conclusion. The part-time work force is overwhelmingly composed of people with non-market work responsibilities. For the most part, part-timers are housewives and young people (usually students), groups which, a generation ago, would be

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[1] See Owen(1970) for a further discussion.

[2] For nonstudent male employees, see Owen (1976b).

likely to have no market employment. Their increased employment does not contribute to any gain in leisure, but rather represents an increase in worktime. The same is more obviously the case for another important segment of the part-time labor force, the moonlighters. Only an infinitesimally small portion of Americans hold two full-time jobs; the vast majority of moonlighters are able to do so because of the availability of part-time jobs in the evening hours or on weekends. But, the development of moonlighting hardly represents a contribution to reducing worktimes. In sum, the development of a large part-time labor market in the past thirty years has not directly contributed to the historic process of increasing the leisure of the working class through workweek reduction. This conclusion is confirmed by other types of analysis -- for example, by directly examining changes in leisure time over time through the use of time budgets. It is also supported by the empirical findings of the present work.

However, one can argue that the spread of part-time work has had some indirect significance for the shorter hours movement, an impact that may become more apparent in the future.

First, there has been a definite downward trend in the number of hours per job, largely as a result of the increase in part-time employment.

Second, the increasing number of part-time jobs has certainly produced more variation in the number of hours worked per worker -- some workers have part-time jobs, some full-time jobs, and some, the moonlighters, one part-time and one full-time job. In a sense, part-time job opportunities act to offset the endeavors to standardize working times through trade union bargaining and through legislative efforts. This trend, together with the recent growth in flexitime (which permits variation in the

timing, but not the number, of hours of work), has afforded some American workers more flexibility in the choice of their work schedules.

The flexibility provided by these alternative work schedules may have an indirect, long-term effect on average hours worked. Thus, some observers believe that increased flexibility makes it easier to live with a forty-hour standard, and hence retards reduction in working hours. For example, if those who are willing to sacrifice income for leisure are able to do so, because of the existence of a large, well-developed part-time job market, they will tend to be less likely to organize within the trade union movement to demand a general reduction in hours for all.

But, on the other hand, it is also argued that the widespread usage of part-time jobs -- especially in the 25-34 hours a week range -- and the experience gained by employers in handling the technical and institutional problems of a short workweek (see section D below), would facilitate a transition to a shorter standard workweek, if and when this becomes politically and economically feasible alternative.[1]

Certainly, the discussion of technical difficulties involved with part-time employment presented in section D is of some relevance to the question of the economic feasibility of a reduced work schedule.

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[1] See below, pp. 42-44, for a discussion of reverse causation: ways in which reduced hours for full-time workers have stimulated employer demand for part-time workers.

B. The Growth of the Part-Time Labor Market and Unemployment Among Full-Time Workers

Some observers are concerned that the increased number of part-time workers is creating unemployment.

Superficially, it appears to be obvious that part-time work would create jobs, not increase unemployment: an employer who divides a job into two part-time jobs is increasing the number of employed. Moreover, he is reaching out to provide jobs to groups that could not otherwise work, and hence appears to be increasing employment.

However, a number of critics (especially among those who look at this question from the perspective of American trade unionism) have a different analysis. Basically, they argue that splitting jobs up in this fashion takes work away from full-time breadwinners, and gives jobs to those who have an alternative source of income -- the moonlighters, college students, housewives, and pensioners who make up most of the part-time labor work force. It is true that workers in the latter group would be classified as unemployed (or as discouraged workers) in the absence of such part-time jobs, since for one reason or another, they are unwilling to take full-time work.[1] However, in the eyes of these critics, the need for work of these so-called marginal workers is relatively trivial -- at least in comparison with the needs of the family breadwinner.

Of course, this view of the impact of part-time employment is not universally accepted. In fact, most professional economists would argue that supply can create its own demand here -- that the number of jobs can in the long-run be expanded to accommodate the needs both of

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[1] The part-time moonlighters provide an obvious exception.

those who seek part-time jobs and those who must have full-time work. In this line of thinking, a movement to create jobs for part-timers should be seen not as dividing up a job among two potential employees, but rather as an addition to the number of part-time jobs, without any diminution of full-time work. This approach would bypass the question of whether the needs of the full-timer for work exceeded those of the part-timer.

However, the issue does have some importance in the short or medium-run, when a sudden increase in part-time job seekers would be expected to be difficult to absorb. Its policy implications cannot be disregarded by the economist (especially in view of the reigning confusion in the economics profession over the etiology of the current economic difficulties -- or the prognosis of their likely duration).

A key issue in this debate is over whether employers use the relative wage of part-timers and full-timers as a guide to establishing the ratio of part-time and full-time workers. Unionists are especially fearful that employers will take advantage of the fact that the part-timer -- not dependent upon his earnings for his livelihood -- will be able to undercut the full-timer's wage offer and so be able to replace him. Hence, the effort made in the present study to determine the sensitivity of the full-time/part-time ratio to wage differences has some relevance to this debate.

C. The Part-Time Labor Market as a Source of Employment to Transitional Groups

Part-time employment has helped facilitate several important changes in the labor force participation patterns. In the first place, the increase in female labor force participation from 37 percent in 1956 to 39 percent in 1965 to 47 percent in 1976 has been greatly assisted by the development of the part-time job market. About two-fifths of all the new jobs for women have been part-time.

Part-time jobs are attractive to many women, for several reasons. Given the existing sexual distribution of labor,[1] the great majority of women have an alternative source of income and so are not completely dependent upon their earnings (in the absence of a working husband, a social security or a welfare check is likely to be available to supplement part-time earnings). Moreover, partly as a result of that same division of labor, women are likely to have extensive nonmarket work responsibilities -- housework, childcare, and so on. Some of these women could handle a full-time job if it were scheduled at a time which meshed with their own nonmarket work tasks (e.g., if it permitted them to be home in the late afternoon, when their children arrived from school).[2] But most jobs are still on a rigid nine-to-five or eight-to-four schedule.

The responsibilities of other women are such that forty hours would be too much, even if they did have full freedom to schedule them.

Of course, many women do not work for pay, and many others work full-time. But part-time job opportunities often play a significant role in

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[1] See Cynthia R. Lloyd, "The Division of Labor Between the Sexes: A Review" in Lloyd.

[2] This is reported to be one result of the European flexitime schemes. See Allenspach.

their lives as well. For many women, part-time employment is important in a transition period between childbearing, when they do not work for pay, and a later period, when the children are grown and full-time work becomes more attractive. In the years in which childrearing, though still time consuming, does allow more time for other activities, part-time work can be used to provide both a source of income and, in some cases, a way of maintaining old job job skills.[1]

Part-time work also eases the transition from school to work for young people. The post-World War II period saw a vast increase in the number of young part-time workers, as student employment rose, from 1 percent or less of the labor force in 1940 to about 6 percent today.[2] This occurred partly as a result of the earlier baby boom, partly as a result of the rising proportion of young people going to college. Demographic changes will soon reduce the relative size of the college age population, but the proportion of youths staying in school is not expected to decline. In fact, given the difficulties many families now incur in paying college costs and the inability of financially hard-pressed colleges to meet these needs through scholarship aid, the future demand for part-time jobs for students could continue to increase, despite the levelling off in numbers of young people. Moreover, other young people, not in school (but not yet fully attached to the labor force) will continue to prefer part-time over full-time work. Hence, this role of part-time employment is likely to continue to be important.

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[1] Part-time work can also serve the female student and older worker.

[2] See Owen (1976b).

Finally, part-time work can and sometimes does help ease retirement from the labor force. A less than optimum use of part-timers is now made here. Phased retirement (a gradual reduction in hours and responsibility, to coincide with the slow diminution of the worker's physical capacity) has been recommended by many experts in the field of gerontology.[1] In this ideal model, the employer gradually phases out the employee; in practice, employers generally prefer an abrupt retirement for their workers. Hence, the older worker must seek part-time employement elsewhere, where he can only utilize a portion of his acquired skills -- as a beginner in a new organization. Another limit on part-time work by older workers is imposed by the social security system. Under present OASDHI regulations, if the worker makes more than $3,000, he loses his pension (at the rate of fifty cents for each dollar earned over this limit). Hence, both employer practices and the operation of the OASDHI system ensure that much less than optimal use is made of part-time work as a way of providing gradual retirement.

Nevertheless, the existing opportunities for part-time work are utilized by a large number of older workers.

A critically important issue in this discussion of the use of part-time jobs to accommodate an increased supply of workers especially interested in such employment is the extent to which employers will react to the demographic composition of their labor force by changing the mix of part-time and full-time jobs. Hence, the investigation of this issue will be an important part of the empirical work of this study.

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[1] For example, see the discussions in Manney and Schulz.

D. Employer Demand for Part-Time Labor: Employer Resistance to the Use of Part-Timers

More and more employers are using part-time help. But this advance is occurring in spite of a long-standing preference for full-time over part-time workers for most jobs.

Obviously, if employers were paying the same weekly wage to both groups, they would prefer full-time help. But even when they must pay the same hourly wages, they have usually preferred the full-timer. This is not to argue that employers will always be willing to pay a higher hourly wage to employees willing to put in longer hours. On the contrary, there is evidence that when hours of work were reduced from very high levels in the late nineteenth and early twentieth centures, production losses were minimal.[1] Workers gained in health and energy from the diminished fatigue and illness effects of long hours. Accidents were less likely to occur, quality control of product was improved, and other, similar benefits were obtained. But this type of dramatic gain, characteristically observed when hours of work are reduced from a weekly total of sixty or more per week to thirty-five or forty per week, is not repeated as one goes from thirty-five or forty hours, to fifteen or twenty hours a week. Moreover, there are a number of reasons why unit labor costs will generally increase with very short hours schedules.

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[1] But see Leveson for a critique of these studies.

1. Training and Promotion Problems

First, the economics of training and promotion make the part-timer relatively more costly. Many companies and government organizations provide formal training programs for their employees, largely or altogether at the company's expense. In others, formal training is limited, but an employee learns his job through experience, gradually become more valuable to the firm. Eventually, he will be promoted through the various skill ranks of his job. In some cases, the worker will then move up to a managerial or other higher position in the firm.

Part-timers are generally regarded as unsuitable for beginning jobs in these "mobility chains:" a basic argument against the use of part-timers here is that the expected total number of hours worked in the firm by a part-timer will be much less than that worked by a full-timer. In the first place, many managers believe that the turnover rate of part-timers exceeds that of full-timers. Others point to contradictory experiences, leading to some question about the relationship between turnover rate and part-time status.[1]

But even if turnover rates are assumed to be exactly the same for the two groups, the part-timer will still put in fewer hours with the company, by reason of his reduced weekly schedule.

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[1]The empirical measurement problem is complicated here because the quality of the part-time labor force often is different from the quality of the full-time labor force. See below pp. 31-34.

The implications of this difference for the economics of training can be elucidated with a simplified example.[1] Let us make the assumption that it takes an employee eight-hundred working hours to become fully skilled in a particular job. Over this period as a whole, his net value to the company is assumed to be zero: the contribution he does make as he approaches full-skill level is offset by extra costs in the earlier period, such as that of providing instructors; of disrupting other workers (who informally help him to continue to improve his job skills after the formal training course); spoiled work, and so on. The hypothetical employee is paid $2.00 an hour during the training period and $3.00 afterwards. After his training, he is worth $4.00 an hour to the company, so that the firm then receives a net benefit of $1.00 an hour from the trained employee.

Assume also that the average employee puts in eighty weeks with the company before quitting, or otherwise being separated.

Under these assumptions, the average full-timer (whom we will assume works forty hours a week) will finish his training in twenty weeks (800/40 = 20); this will leave him 60 weeks to work as a fully-skilled employee. The employer pays $1,600 (800 x $2.00) in training costs, but receives $2,400 (60 x 40 x $1.00) in post-training benefits, for a handsome net surplus of $800 on its $1,600 investment -- a 50 percent return.

The case of the part-timer is rather different. Assuming a twenty-hour week for the part-timer, he will take forty weeks to finish his

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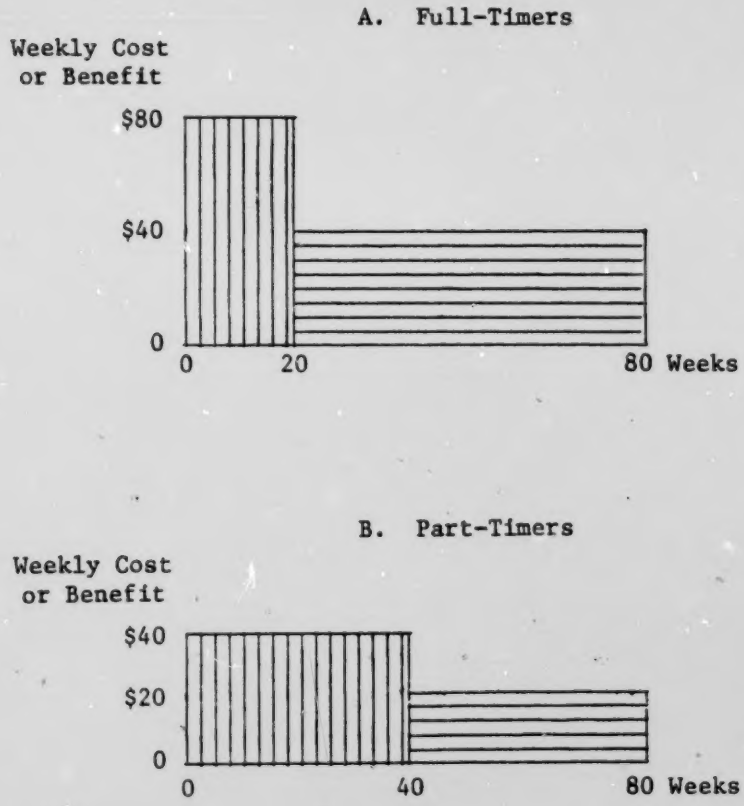
[1] To simplify the exposition, the argument is made here for the case where the employer pays the cost of training. A similar argument can be made in the case where the employee pays (usually by taking a lower wage while acquiring training than could be obtained by working as an unskilled employee elsewhere).

Figure 1

Economics of Training Part and Full-Time Workers

(See Text for Explanation)



training (800/20 = 40), leaving a forty week pay out period. The training costs are the same as in the full-time case ($1,600), but the pay off is now only $800 (40 x 20 x $1.00), so the company loses $800 on its $1,600 investment. Of course, this example would in practice have to be modified in a number of ways to make it more realistic. (For example, the learning of some tasks benefits more from an intensive eight-hour-a-day exposure than others. And individuals also vary in the extent to which they will profit from a more concentrated work experience.)[1]

But the basic logic of the example does help to explain the reluctance of managers to hire part-timers for jobs that require much training.

Another factor that helps to explain this employer reluctance to train part-timers is the restricted "option value" of the trained part-timer. Writers in the field of the economics of education and training have in recent years stressed that we should consider as part of the return to training not only the benefit that will be derived if the trainee spends the rest of his life (or at least the rest of the period with the company that trained him) doing just the task for which he is trained, but also the gain that will be obtained if the employee is subsequently subjected to still further training, for a higher position (or for a horizontal move, if demand conditions change).

These additional options are more limited for the part-timer for two reasons; first, because it may be that the economics of training argument detailed above would make further, more complex training uneconomical for the part-timer.

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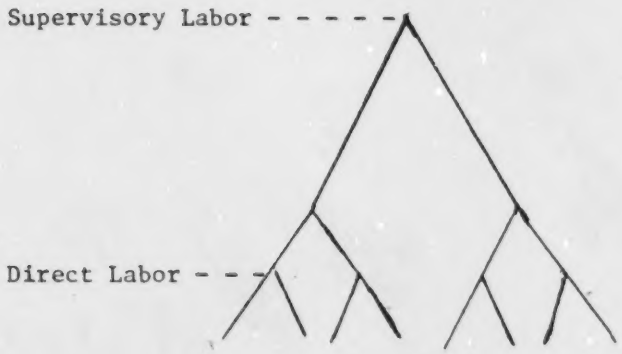
[1] Very similar results are obtained if it is assumed that there is a constant separation rate, q , so that t periods after a group of workers of size N is hired, Ne^{-qt} are still employed.

Second, because the time restrictions -- hours per day and time of day -- imposed by the part-timer often sharply limit the number of jobs an individual can fill. For example, a housewife available mornings only may make a perfectly good switchboard operator, but might never be thought of as eligible for a job as, say, assistant office manager.

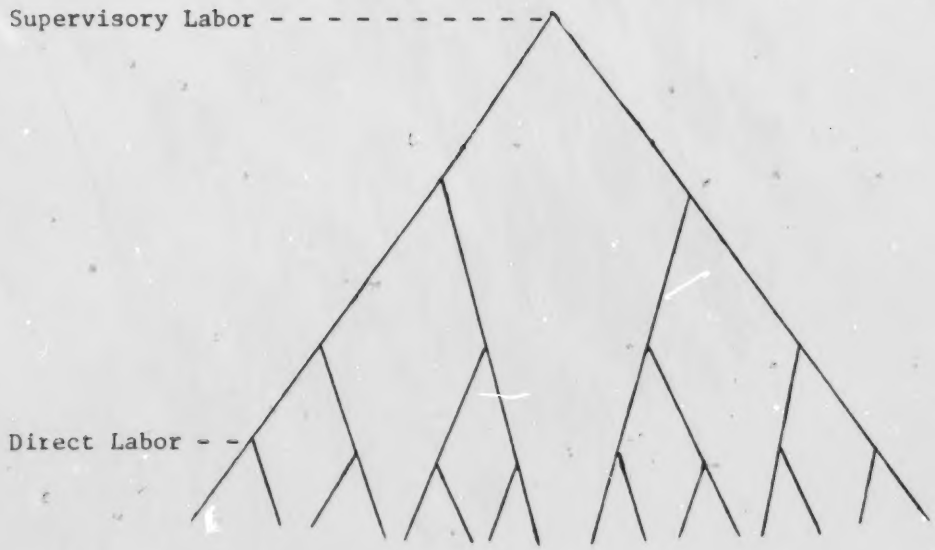
Figure 2

Supervisory Costs of Part and Full-Time Workers
(Simplified Illustration of Organization Chart: See Text)

A. Full-Time



B. Part-Time



2. Supervision, Coordination and Communications Problems

A second objection to part-time employment relates to supervision, coordination and communications costs. If a set of full-time jobs is divided into part-time jobs (say, on a two-for-one basis), the size of the direct labor work force may be just doubled, yielding no change in direct labor costs. But indirect costs are likely to be increased. The probable increase in training costs imposed by the use of part-timers has already been discussed. But there are other costs which might also be increased, as a result of using more people to do the same work.

There is a fairly extensive literature by economists and, especially, by organization theorists, on the influence of the size of a business or government organization on its efficiency. It is generally agreed that size has both advantages and disadvantages.[1] But most of the advantages of scale that are adduced can be restated as due fundamentally to gains from specialization: as the number of employees is increased, it is argued, they can be trained for ever more specialized tasks. Similarly, in a larger business, specialized departments can be developed and utilized to assist in the management and administration of the enterprise. However, none of these advantages is obtained when the number of workers is increased by replacing full-timers with part-timers. The economics of training argument developed in the preceding section predicts that less, not more training will be given the part-time work force. And no increase

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[1] See Price, especially the chapters on size, communications, and span of control; Khandwalla, especially pp. 295-297; and William H. Starbuck, "Organizational Growth and Development" and Joseph L. Massie, "Management Theory," both in March.

in production or sales is expected which would provide an economic justification for creating a more specialized departmental structure.

But if increasing the number of part-timers does not bring the advantages of size, it does impose the disadvantages of a larger work force, discussed in the size economy literature. More specifically, an increase in the work force will, ceteris paribus, increase supervision, coordination, and communication costs. As the number of employees is increased, either the span of supervisory control is increased, so that each supervisor must oversee more workers, or the number of layers of supervision is increased (as in Figure 2). Hence, one would predict either a reduction in productive efficiency or an increase in administrative costs (depending upon whether managers are utilized more intensively, or their ranks are increased).

Coordination and communication costs are also increased. Figure 3 presents the classic view of how these could increase as the number in a simple work group is increased. If the initial size of the group is large, the number of links quadruples as the number of employees doubles. For smaller groups, a more rapid rate of increase is predicted. If interactions or combinations of workers -- pairs, trios, and so on -- as well as among single workers are considered, the increase in the number of possible interactions will, even for a quite small work force, quickly reach astronomical proportions.[1]

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[1] If there are n individuals in a group, the number of possible individual interactions is given by $\frac{n(n-1)}{2}$. The number of interactions among subgroups is $2^n - n - 1$. See Starbuck, op. cit., p. 497.

In practice, communications and coordination costs need not rise quite so rapidly. In the first place, not all workers need to interact with each other (or with all possible subgroups of workers). In the second place, the flow of work and information is to some extent controllable by management and, at some cost it is true, can be modified by various types of job redesign plans as the size of the organization grows, limiting the rise in communications and coordination costs.[1]

On the other hand, the use of part-timers imposes an especially difficult set of supervisory, communications, and coordination problems, when the part-timers are used sequentially: for example, when two or more shifts of part-timers are employed to maintain a needed service over an eight-hour period, or to obtain a more economical use of workplaces (see the discussion in the next section). Then, two or more groups are formed, with no obvious means of communication and coordination. Here it is necessary to improvise -- to use a full-time worker, a full-time supervisor, or overlapping shifts, to establish some type of interaction.

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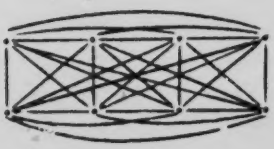
[1] For example, workers can be organized into groups, which keep themselves fully informed, with systematic channels of communications with other groups.

Figure 3

Communications Links with Increased Number of Employees

No. of Employees	No. of Links	
1	0	
2	1	
4	6	
8	28	
16	128	(Too complicated to sketch)

3. Workplace Utilization Problems

Another cost of increasing the number of employees needed for a given work output is that it may require much more capital stock. This is most dramatically true in such industries as manufacturing, mining and railroads (and in fact is probably the chief reason for the low level of part-time utilization there). However, it can also be important in other situations -- for example, clerical work in a high-rent office district.

A typical managerial response to this problem is the use of shift work. When full-time labor is used, the addition of an evening or night shift can be employed, to double (or triple) the utilization of capital equipment. But in practice, even the manufacturing industries make a limited use of shift work: shift workers are hard to obtain, require an hourly pay differential, and are very often not as productive as day workers.[1]

The shift work principle is sometimes employed in part-time employment as well. For example, one clerk can be employed in the morning, and another in the afternoon, to maintain utilization of a desk in a high-rent office area.

But the shift work principle is no panacea here. In the first place, the supply of morning workers and afternoon workers may not be equal

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[1] See Owen (1976a). In the present economic conditions, depressed product markets and high costs provide additional reasons, in many industries, for staying with a single shift.

(see section C above). In the second place, using part-timers in shifts considerably increases communication problems among the work force (see the discussion in the preceding section). Hence, in situations where the employer wishes to maintain operation of his facility, full-time help have a competitive advantage over part-timers.[1]

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[1] An intriguing exception is the "minishift" — a half-time shift of part-timers which comes on the job after the day shift is through, thus providing twelve hours a day of utilization. However, despite the interest in this innovation shown by journalists and by advocates of alternative work schedules, it has yet to have important impacts on American work scheduling practices.

4. Other Disadvantages of Using Part-Timers

There are other costs of using more employees to do the same amount of work. Even when no training is required, each new employee must be recruited and screened before being put on the payroll. By cutting hours in half, the employer doubles the ratio of all these fixed costs per employee to hours of worktime.

The fact that part-timers are a minority group in the labor force may impose additional expense on management. For example, fringe benefit packages often must be prorated for the part-timer.
Partly because of the resistance to change by many tradition-bound managements, this type of objection frequently has a disproportionate influence on employer decision-making.[1]

Government employee welfare programs -- especially the social security and unemployment insurance programs and the ERISA regulations of private pension plans -- could, in principle, also have a very strong effect on the employment of part-timers, insofar as they forced employers to treat part-timers more or less favorably than full-timers. In practice, however, these programs contain a mixture of positive and negative provisions, so that their net effect upon the employer's incentive to hire part-timers at the present time is uncertain.[2]

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[1] See Nollen, Eddy and Martin.

[2] See Nollen, Eddy and Martin.

E. Employer Demand for Part-Time Employees: Factors Supporting Increased Usage

The list of disadvantages in the preceding section helps us to understand the relatively limited use now made of part-timers, but does not explain the rapid growth in the use of part-timers that has taken place.

1. Better Supply of Part-Timers

The most obvious reason for this growth is that there is now available a very substantial supply of potential part-time workers, as a result of the changing labor force trends discussed in section C above. This abundant supply has a number of implications for employer decision-making. In some job situations, it means that part-timers can literally be paid less per hour for just the same work. In other situations, institutional considerations -- union rules, company practices, civil service requirements, considerations of employee morale and so forth -- prevent such wage differentiation, but the abundance of potential part-time labor still makes it more attractive. Even if he cannot vary the money wage, the employer may still be able to obtain better quality labor for the same hourly wage.[1]

Neglect of this very important point has often led to misunderstanding of the operation of the part-time labor market. In the empirical survey method, employers are asked how their experience with part-time and full-time help compares. The employer often cites a number of favorable experiences he has had in using part-time employees which, if not correctly

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[1] And, hence, pay a lower quality-adjusted wage.

understood, can be mistakenly interpreted as denoting the efficiency of part-time work, rather than the ability of employers to tap a wider pool of labor, if he opts for part-time workers.

More specifically, the better supply of part-timers permits employers to obtain workers who are mature, experienced, and well-educated. Or, depending on the nature of the employer's need, workers with such specific characteristics as a strong back, nimble fingers, or an attractive appearance.

Moreover, the personal qualities of the part-timer cannot only outweigh the disadvantages of part-time work for the employer; under some circumstances, a supposedly negative characteristic can, in a sense, actually be converted into a positive feature of using part-timers. For example, it was argued that a disadvantage of using part-timers was that it was generally not economical to train them. This was a formally correct argument for the average employee. But, as any employer knows, workers vary very widely in the speed with which they learn a new job. If the supply of applicants for part-time jobs consists overwhelmingly of those whom the employer perceives as "quick learners" -- at least in comparison with what the employer can obtain at the same hourly wage among full-timers -- then he will have to rethink his opposition to hiring part-time workers on these grounds. Hence, under some circumstances, it will be more economical to train part-timers than full-timers, despite the obvious technical argument. More generally, the formal objections to part-time employment in terms of hiring, screening, training, supervision and communications costs can all be turned around when the "human factor" argument strongly favors the part-timer.

In practice, this factor gains importance because of widespread differences in the quality of part-time workers and because of the heterogeneity observed among job situations in terms of the relative importance of human and technical factors. Part-timers span the range of educational levels. Their average attainment is quite similar to that of full-timers. Sometimes the formal education of the part-timer provides a skill which enables him to move directly into a high status job, without any further on-the-job training. (A part-time school teacher would provide a good example here.) Other types of schooling -- for example a liberal arts education -- may simply make the worker a better learner, as well as a generally more productive person after he is broken in on the new job.

Part-timers vary considerably in the amount of job experience which they have acquired. Housewives who are re-entering the labor market, or older workers who are stepping down from full-time jobs often have substantial amounts of useful job experience. True, they are not likely to find work as part-timers with the same firm that trained them as full-timers; but if they can find work in the same field, that aspect of their training which is of general use in the field, as opposed to that of benefit only to their previous employer, will still have value. (This distinction corresponds to that made between "specific" and "general" training," by the human capital school of economists.)

And even in the unlikely case that the mature part-timer has never worked full-time, he or she will still have some general job experience (although probably at rather low level jobs).

Such advantages are, of course, lacking in the young part-timer, but he or she may have other specific, attractive characteristics for the employer.

The broad back of the young male athlete, or the native sales ability of the attractive young coed, or the intelligence and ambition of the straight "A" student, will recommend them for specific openings in the part-timer labor market.

The job experience of part-timers with such characteristics will often be quite different from the experience of those with more average qualities. In fact, many of the more successful may be able to compete with full-timers for relatively good jobs.

2. Changing Industry and Occupation Mix

Job situations also vary in the degree to which the technical conditions are adverse to part-timers. In some jobs, technical conditions make the use of part-timers very difficult. In others, part-timers are only at a modest disadvantage, so that a relatively better quality (or lower cost) supply of part-timers can easily tip the balance in their favor. In still others, technical conditions actually favor the use of part-time work.

A second major reason for the increase in the usage of part-timers has been a change in the distribution of jobs in the economy -- away from employments where part-timers are at a disadvantage and towards those in which there is a real need for part-time workers.

Not all of the change in the industrial and occupational structure has had a positive effect on the demand for part-timers. One advantage of part-time work is that in very boring or strenuous work, there is some gain in productivity as one goes from eight to four hours a day. But with increasing mechanization, and a general upgrading of jobs, the proportion of jobs in this category is declining, reducing the importance of this argument for a shorter workweek. At least a partial offset, though, is found in the greater emphasis put on the "responsibility factor" in heavily mechanized or automated factory work. The costs of fatigue-induced error here can be much greater than the costs imposed by fatigue in a simpler industrial environment. Another offset arises from the high job expectations of many workers -- especially the young, "over-educated" employee. Managers report that this group is easily bored, and some do find that a half-day shift will significantly raise productivity.

A second negative factor is the increase in professional and technical occupations, and the continued development of what some labor economists call "internal labor markets." Workers in the professional and technical occupations generally require, and obtain, more post-school training than others.[1] "Internal labor markets" in large corporate or government bureaucracies establish elaborate training and promotion ladders; young workers are introduced into the bottom rung, and gradually work their way up. Moreover, the size and complexity of these bureaucracies often create complicated problems of supervision, coordination and communication, which would tend to reduce the use of part-timers (see section D.2 above). The analysis of training economics in section D.1 suggests that both of these developments would tend to limit the employment of part-timers.

However, a number of changes in the industry and occupation structure have been more favorable[2] to the employment of part-timers. First, there has been a dramatic decline in the proportion of the work force employed in manufacturing, mining and railroads. Part-time work is generally not economical in blue collar occupations in these sectors, for several reasons. Close interaction among large groups of employees is often needed. An extreme example is provided by the automobile assembly line, but interconnectedness is found to a greater or lesser extent in most employment in

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[1] Only a partial offset would be expected to result from the use of part-time professionals by small businesses, which are unable to afford the services of one or more full-timers.

[2] One indirect factor may have been increases in demand in occupations traditionally dominated by females -- e.g., clerical work, many service industries, and some retailing industries. Then, the greater preference for part-time work among females would help to explain its growth. Since more females than males prefer part-time work, an increase in female job opportunities in general would be expected to increase the proportion of part-time employment.

these sectors. Moreover, work stations in these sectors are typically quite expensive so that when part-timers are used, they must be employed in shifts, imposing a number of costs.[1] For these and other reasons, the decline in the relative demand for labor in the manufacturing, mining and railroad sectors must be considered as a positive factor in increasing the demand for part-timers.[2]

A second, positive change has been an increase in the employment of clerical workers. Clerical work encompasses a rather heterogenous group of work situations, but in general the technical objections to part-time work have much less strength here than in the manufacturing, mining, and railroad sectors. Interactions among clerical workers are typically less rigidly determined by technical considerations than is the case in industry. Moreover, work stations are usually much less expensive to provide for clerical workers. Finally, clerical workers sometimes have functions which are heavily overlapping with those of the service sector. As an example, consider a municipal employee in a local hall of records. He will be designated as a clerical employee, although much of his time may actually be spent in dealing with citizens' requests for information -- a function ordinarily regarded as part of the service industry. In such jobs, a strong positive case can be made for employing part-timers (see below).

Perhaps the most important demand-side change favoring part-time employment has been the sharp increase in the service industries; since

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[1]See above, p. 26.

[2]See Nollen, Eddy and Martin for a discussion of institutional resistance to change by conservative management in this sector. But see also Hallaire on the use of part-timers in manufacturing by a number of European firms, acting under the pressure of very tight labor markets.

there is often an actual technical advantage in this sector in the use of part-timers. As a result of service industry growth, an increasing proportion of the population is employed in dealing directly with customers, or the users of a service. Restaurants, health care facilities, security, recreation, adult education, retail trade, repair work, and a variety of business service industries all provide examples.

The reasons for the widespread use of part-timers in these situations has not been sufficiently developed in the literature. A basic characteristic of a service demand is that it has a time distribution which is imposed by the customers' needs to be served at a specific time (or at least is a compromise between customers' needs, and those of the employer and his staff).

In contrast with work that is produced for stock, service demands typically have an erratic pattern over the day or week. Even in a highly cyclical industry, a manufacturer can generally plan to maintain an even pattern of production over a week or month: for example, in very good times, he may decide to pay overtime and schedule work at ten hours a day, five days a week, and need to revise his estimate only, say, once a month.

But a service industry will typically not have such uniformity of output. There will be certain "busy" periods, during the day or week. In many such industries, much of the customer demand will be found in the evenings, and on weekends, dictating long hours of operation.[1]

There are a limited number of methods for dealing with the problem of predictably irregular service demands. a) Employees can be asked to

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[1]In addition, there is considerable unpredictable variation. But this can only be met by defensive management strategies -- for example, by overstaffing.

work overtime on a regular basis, to maintain hours of service beyond forty per week. b) Employees can be kept on duty even during slack periods when they are not needed. c) Employees can be hired for "shift work" (using that term now to denote any nonstandard but full-time schedule -- for example, 11 A.M. to 7 P.M.)[1] Or d) part-time workers can be employed.

In practice, all four of these alternatives are used, often in combination. But each has special advantages and disadvantages. The drawbacks of the first two are obvious. Premium pay for fatigued workers raises labor costs, often dangerously above a competitive level. Similarly, while semi-idle employees are quite often an inevitable cost of the "slow" period in many service or distribution outlets, management must regard this as an unavoidable evil, to be kept at a minimum.

The use of full-time shift workers sometimes provides an optimal solution, but this condition requires a special time distribution of orders. For example, if the work flow for the salesmen in a small department follows the pattern in Figure 4A, shift work would provide an ideal solution. In this special case, demands would be met perfectly by two shifts of ten employees each, 8 A.M. to 4 P.M. and 12 P.M. to 8 P.M. But in the absence of such an unusually perfect fit, the result of using the shift option alone is to have idle, or semi-idle workers much of the time. For example, in the above illustration, consider the scheduling problem imposed by only a slight modification: e.g., if the peak period extends from 12 P.M. until 6 P.M. Now, only the part-time option (or some combination of part-time and full-time workers) would yield a perfect fit.

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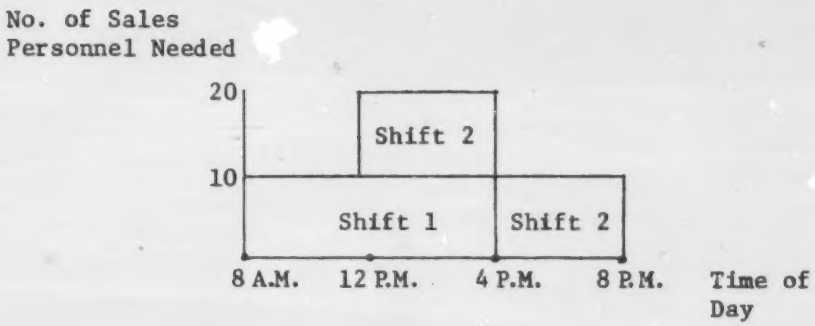
[1] Or the four-day, ten-hour-day workweek. Indeed, this is an important use of the compressed workweek.

Figure 4

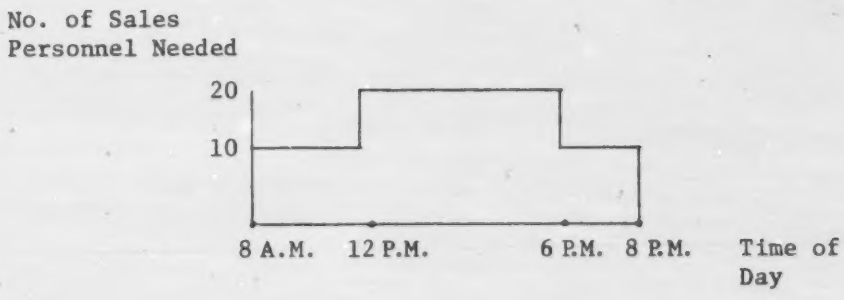
Distribution of Service Demands

A. No Need for Part-Timers

(Assuming Availability of Full-Timers)



B. Part-Timers Needed



Thus, if the peak runs from noon to six, ten part-timers could be employed from four to six, and full-time shift workers used to handle the remainder of the business. Or, more extensive use of part-timers could be made. This second case is the more common result: full-timers usually cannot fill the schedule need, without some employment of part-timers.

The increased demand for part-timers in the service industry is in part due simply to the expansion of that sector -- due in turn largely to the relative greater difficulty in mechanizing and automating people-to-people services, at least in comparison to the manufacturing sector. It would appear that the prophecy of the depressed nineteen thirties that we would all be "reduced to taking in each others washing" if mechanization continued, has in a sense been fulfilled, although without the negative consequences foreseen at the time.[1]

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[1] The high income elasticity of many services and the low price elasticity of demand of some services were contributing factors.

3. Reduction in Full-time Hours

But there have also been changes in the service sector which have increased the demand for part-timers relative to full-timers within that sector. A principal factor has been the reduction of hours of work of full-time workers. In the nineteenth or early twentieth century, the employees of a retail or service establishment worked when the store was open, no matter how long its hours were. For example, pharmacy clerks in turn-of-the-century New York were reported to work upwards of 100 hours a week. This was an unusually long schedule even then, but hours of 70 or 80 per week were not at all uncommon in other service or retail trade areas. True, the clerk might be idle during the "slow" times of the day, or at least underworked, but this slack was used to justify the long weekly hours. Such occupations were regarded as "light" work and as such were considered suitable for long hours schedules (since the worker was less fatigued, neither his health nor his input -- and hence his employer's profit -- were as sensitive to long hours as would be the case as in, say, heavy industry.)

Because of the assumption that the clerks' hours would coincide with those of the shop, the historic movement to shorten hours in the retail trade and service industries naturally became linked with the struggle for local "early closing" regulations, support of blue laws, and so on. These efforts were quite often supported by local shop owners, who felt that while such restrictions might inconvenience the customers, it would not lose sales, if collective action in a particular line could force customers to adjust their shopping habits to a less convenient pattern.

In fact, compressed schedules would reduce employer operating costs, while providing an essentially free benefit to their employee.[1]

Hours of work in the retail trade and service sectors remained as long or longer than hours in most other sectors until quite recent times. The original Fair Labor Standards Act of 1938 covered manufacturing workers. But subsequent amendments extended coverage to most workers in the retail trade and service industries. Hours in these sectors have declined steadily in recent decades, and are now actually well below those in manufacturing. In practice, the reduction in full-time hours schedules in the retail trade and service sectors has greatly increased the demand for part-timers.

Of course, an alternative method for management to deal with this shortening of full-time workers' hours would have been a proportionate reduction of hours of operation in these sectors. But this course was generally not taken. In fact, newspaper and industry accounts talk of movements towards ever longer hours, repeal of blue laws, even twenty-four hour operation in some cases. There are a number of reasons for this development. For example, suburbanization based upon widespread use of automobiles would now subvert a community agreement on early closing -- many residents would simply shop in an adjacent suburb, or at a highway shopping center. However, a probably more basic reason has been a shift in American shopping patterns, based in turn upon deepseated economic and social

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[1]See Estey for a discussion of nineteenth century efforts to achieve the goal of early closing in retail trade, and of the difficulties of maintaining a collective agreement to prevent what he calls "hours wars" among merchants.

change. The crucial factor in explaining the resistance to early closing today is that in the typical American family today, all the adult members are in the labor force. With the introduction of social security and other pensions in the post-World War II period, the proportion of older folks residing with their children dropped sharply. In the same period, female labor force participation soared. More recently, the proportion of female-headed households has risen dramatically. As a result of these several trends, the adults in the family (who of course do most of the shopping and purchasing of services) must make their purchases outside of their working hours -- there is no full-time housewife (or grandmother) to run these errands during the working day. Hence, those supplying families headed by prime-aged adults must maintain operation in the evenings, on weekends, or other periods.

4. Trend Towards Labor Intensive Services

Moreover, there appears to be a trend towards purchasing those services which are labor-intensive, which accelerates the movement towards employment in nonstandard hours. Taking this point into a more speculative realm, it might be appropriate to change the image of the future from one in which "everyone is taking in each other's washing" to one in which everyone is serving the others Kentucky fried chicken, removing each other's appendix, or providing swimming lessons. (After all, washing clothes is increasingly mechanized, and could readily be automated, if this were economically desirable.)

In this futurist world, there is no standard worktime -- everyone's employment requires someone else's "disemployment," or leisure, during which the worker provides the service to the consumer. Irregular patterns of shift work and part-time work would inevitably be dominant in such a world. We have only taken a step towards this ideal model. But the growth of the recreation industry, and the astonishing increase in recent years in the proportion of meals taken in "restaurants" (or, at least, fast food outlets) appears to have already helped to raise the demand for part-timers.

III. Empirical Findings From a Cross-Sectional Analysis of the Market for Voluntary Part-Time Workers

A. Introduction

The first section of these empirical findings presents the results of studying the earnings of individual part-timers. An attempt is made to determine the extent to which part-timers are paid less than full-timers; the extent to which part-timers have characteristics that would account for their being paid less than full-timers (i.e., have a different race, sex, education, and experience composition); and the extent to which these background characteristics receive a greater or lesser reward in the labor market, in comparison with full-timers.

Sectoral differences in the relative reward to part-timers are then analyzed as possible additional determinants of the earnings of individual part-timers.

In the second section of this discussion of empirical work, interactions between sectoral differences in the reward to part-timers and sectoral differences in the utilization of part-timers are explored in the context of an intersectoral model of the supply and demand of part-timers.

B. Individual Earnings of Part-Time Employees

1. The Basic Model of Earnings Determination

a. Some Basic Hypotheses About Individual Earnings of Part-Timers

Both neoclassical theory and the limited qualitative information on part-timers suggests several hypotheses about their earnings.

1. First, a lower level of hourly wages for part-timers is predicted. There is some debate in the empirical literature as to the extent to which it is customary actually to pay part-timers less than full-timers for just the same work -- although it is clear that some employers do just that. However, there is consensus that part-timers are widely excluded from training and promotion opportunities, for the reasons developed in section II.[1] Insofar as participation in this type of job opportunity yields a positive net gain in earnings, exclusion would mean lower average earnings for part-timers.

2. However, this unwillingsness of employers to train part-timers does not mean that job experience is not beneficial in this market; in fact, experience may yield a relative gain in the earnings of part-timers as great or greater than that obtained by full-timers. Inexperienced, untrained workers who seek part-time work might have considerable difficulty in finding it; they would be apt to be confined to jobs that neither required previous training nor offered training opportunities. Mature workers seeking part-time work are in a much better position. They are likely to have had some years of prior full-time experience when they were trained (e.g., before maternity, or before retirement). Even in the unlikely event that they have had no earlier full-time experience, some general job skills will have been picked up over the

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[1] See Nollen, Eddy and Martin.

years at part-time employment (again using the term "general" to denote skills or training that have use for more than one employer). These general skills will typically reduce the amount of further training and "breaking in" that would have to be done, and so will make the experienced applicant much more desirable (since we have argued that the employer does not want to train part-timers).

3. For somewhat similar reasons, the relative earnings payoff to education may also be high for part-timers. True, the higher jobs in management and the professions are rarely open to part-timers. But within the restricted opportunities of the part-time labor market, education affords a distinct advantage. The general training afforded by education (like the general training obtained through labor market experience) would be expected to make the part-timer more effective. Vocationally-oriented training would have an obvious payoff (viz., the case of part-time school teachers). But liberal arts education might also help, if the employer believes that the better-educated applicant will learn a job more quickly, and will perform better after training.

A special factor reinforcing this effect is the economy-of-scale argument sometimes mentioned in the empirical literature: one market for part-timers is in small firms or other specialized situations, where only a portion of a specialized input is needed (e.g., one-half of an accountant). Since such specialization is correlated with education (the firm is less likely to need just one-half of an unskilled laborer), the relative demand for part-time, educated labor is increased.

4. Race and sex differences. Insofar as differences in the earnings of blacks and whites are due to differential hiring practices for jobs that offer training and promotion opportunities, and for providing such opportunities, one would expect relatively smaller differences based upon race among part-timers than among full-timers (since white as well as black part-timers will be denied such opportunities). Sex differences might still be large, especially among young workers at relatively low levels of schooling. Here, sex differences in biologically determined traits or early socialization might have the most effect (e.g., the greater physical strength of young males would be useful in competing for unskilled part-time jobs requiring heavy physical strength).

Time-of-Day Hypotheses

Very little has been written on the effects on wages of the time of day that work is performed. Yet certain obvious hypotheses suggest themselves. Among full-time employees at the same type job, a positive shift differential is customarily paid to those working nonstandard hours. But the overall net effect of time-of-day on wages is uncertain. Higher levels jobs offering opportunities for advancement are usually scheduled during standard hours, reducing the potential earnings of mature workers who prefer nonstandard hours. Hence, one might find a smaller relative return to education or experience for this group.

Similar uncertainties surround the effects of time-of-day schedule on the wages of part-timers. One would clearly expect certain preferences among employees: we would predict that women with school-age children would want jobs that allow them to be home in the late afternoon, to permit them to care for their children, and would expect young people to prefer jobs in the late afternoon, because of their school schedules. However, it is not clear that such groups would have to pay a premium for their preferred schedules. First, it is possible that the different schedule demands of students and housewives may be mutually offsetting. Second, as we have seen, an important determinant of the need for part-timer workers is due to irregular, but predictable, variations over the day or week in the demand for labor in many industries and occupations. Hence, the net effect of special schedule needs of employees on the price of their labor will depend upon such factors as whether students and housewives were close substitutes in production, or whether the time-of-day preferences of employers tended to correlate with those of employees.

b. Empirical Results from the Basic Model

These hypotheses on individual earning functions were tested by application of a widely-used, simple earnings function to various sub-groups in the labor force (males and females, full-time and part-time, shift workers and standard schedule workers).[1]

$$(1)\quad \text{Ln Wage} = a + b(\text{Race}) + c(\text{Education}) + d(\text{Job Experience}) - e(\text{Job Experience})^2 + u$$

In this basic model, a constant percentage wage increase is obtained per additional year of schooling. Earnings also increase with experience on the job, though at a decreasing rate, levelling off at higher levels of experience. Hence, the coefficient of experience is expected to be positive, and that of the square of experience is expected to be negative.

This equation was tested with data for 13,515 non-farm wage and salary earners in the March-May matched 1973 Current Population Survey sample of the U.S. Census. The May, 1973 Survey for the first time collected information on the time-of-day of the employee's schedule, as well as the more conventional measure, the number of his hours. The variable Wage is the hourly earnings of the worker; Race is a dummy variable equal to unity if the worker is white and zero otherwise; Education is years of schooling completed, and Experience is measured as age minus years of schooling minus six years.[2]

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[1] See Mincer for an analysis of this function.

[2] These variables approximate the formulation in Mincer (with the exception of the race variable -- Mincer used an all White sample). See footnote 1 on p. 56 for further discussion of the experience variables.

The results of least squares regression of this model with various groups are given in Table 1 (equations 1). Full-time workers are those members of the full-time labor force who usually work thirty-five or more hours a week. Part-timers here are those who voluntarily usually work one to thirty-four hours a week (i.e., do not wish full-time employment). A full-time shift worker is defined as a full-timer who neither begins work between 6:30 and 9:30 in the morning nor ends work between 2:30 and 6:30 in the afternoon. A part-time, home-in-the-afternoon, worker has a schedule that does not require work between 2:30 and 5:30 P.M., and hence would permit them to be home at that time.[1] Other part-timers are classed as away-in-the-afternoon workers.

Table 2 is based on Table 1. The first column gives an average value of wage rates in each of the seven subgroups. The second column gives the earnings that each would receive if, with their present characteristics, they were rewarded in the market place in the same way as male full-timers (i.e., uses mean values of the subgroup's race, education, and experience variables, together with the regression coefficient obtained in equation a.1 of Table 1, to calculate estimated wage rates). Column three estimates earnings using the results from the function for full-time female earners (equation c.1 of Table 1).

The two tables yield very interesting information about part-timers. Male part-timers are paid less than one-half the full-time rate. A portion of this gap is due to measured differences in individual characteristics (chiefly, the high proportion of young, inexperienced male part-timers). But even after an adjustment is made for this factor, full-timers earn

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[1] Of course, many workers would not spend their afternoons at home. However, the distinctive feature of this schedule is that it does permit workers to provide child care in the afterschool hours.

half again as much as part-timers. The characteristics of female full and part-timers are nearly equal, but female part-timers still earn little more than three-quarters the full-time, female rate.[1]

The regression analysis generally supports the hypotheses in section A above. The lower wages of part-timers are associated with the much lower constant terms observed for that group.[2] The other regression coefficients suggest that the relative payoffs to individual characteristics are on balance as good as those for full-timers.[3]

Both education, and the experience variables, distinguish as well among part-timers as among full-timers.[4] In fact, the payoff to experience may be somewhat higher among female part-timers. Experience coefficients are

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[1]The observed 21% difference may, of course, reflect other factors, not in the equation, apart from part-time status. Some preliminary work done to standardize for number and age of children, and student status, indicate that the adjusted differential may be about 17 percent.

[2]These imply a 31-39% differential between the earnings of full-timers and part-timers (at a zero level of the independent variables).

[3]An attempt was made to determine whether these were statistically significant differences in constant terms, and other regression coefficients, between part and full-time workers. Part and full-time workers were combined, and a dummy variable was created, equal to one for part-timers and to zero for full-timers. This was introduced into the equation for males and females to determine whether the constant term was statistically significant. Interaction terms, with the constant multiplied by the race, education, experience, and experience squared terms, respectively were next added. The results obtained in these estimations were consistent with the hypotheses that the differences in constant terms were significant for both males and females, and that the part-time/full-time differences in the coefficients of the education and experience variables were significant for females. Other variables yielded mixed or insignificant results.

[4]See the discussion in the next section of the effect of race on earnings.

similar among male part-timers and full-timers, but are significantly lower among female full-timers.[1]

Thus, these results support the hypothesis that, while part-timers are in general barred from well-paying jobs, there is till a sharp differentiation among them on the basis of education, experience and sex.

The time-of-day results in equations 1 afford an interesting complement to those based upon duration of worktime. The regression results for female full-time shift and nonshift workers are rather similar. However, the heavier concentration of male shift workers in manufacturing, mining and railroads produces a somewhat different result: a much higher constant term is observed for male shift workers, but a very low payoff for education and experience (consistent with the hypothesis that positive shift differentials are to be offset by reduced opportunities for high level jobs at nonstandard hours). Overall, male shift workers earn about eight percent less than standard workers.

The cross-sectional analysis in section C below demonstrates that, among part-time employees, women, especially those with young children, are much more likely to be employed at jobs that permit them to be at home in the afternoon. Also, young single males are much more likely to be employed in the late afternoon (see Table 4a).

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[1] See Mincer and Polachek for an analysis of the return to experience among female workers. The CPS survey data used in the present effort permits only a very crude measurement of experience (age-schooling-five). Among females, one would expect this measure to be positively correlated with experience, but to overstate it. Moreover, part-time experience would be expected to lead to less earnings growth than full-time experience. Hence, it is at first glance surprising that the proxy variable yields such positive results for the influence of experience on part-time earnings. However, if mature women workers typically move back and forth between part and full-time work, the work history of each will be a composite of the two types of job experience. Preliminary results from a longitudinal study of mature women now in progress finds that such movement is in fact very common. See note 4 on page 5 above.

However, such time-of-day differences in the employment of part-timers do not appear to affect their wages (See Tables 1 and 2). The average wage- and the returns to individual characteristics are roughly the same among the two groups of females.[1] (The male "home-in-the-afternoon" group was too small for a successful regression estimate of this type.)

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[1] An attempt was made to determine whether there were statistically significant differences in constant terms, and other regression coefficients, between the two groups of female part-timers, using the method described in note 3 on page 55. The results did not reject the hypothesis of no statistically significant differences.

TABLE 1

Earnings Functions for Full and Part-Time Employees

Full-Time Workers

a. Male, Standard Schedule

1. $\bar{R}^2 = .27$

Log hourly wages = .0049 + .2136 (Race) + .0663 (Education) + .0344 (Experience)

t-ratio (9.85) (32.64) (23.92)

$- .0005 (Experience)^2$

t-ratio (-18.00)

2. $\bar{R}^2 = .28$

Log hourly wages = -.3552 + .2241 (Race) + .0892 (Education) + .0524 (Experience)

t-ratio (10.35) (22.75) (17.46)

$- .0007 (Experience)^2 - .0010 (Education) (Experience)$

t-ratio (-22.00) (7.00)

(Table 1 - Continued - Page 2)

Full-Time Workers

b. Male, Shift Work

1. $\bar{R}^2 = .14$

Log hourly wages = .6044 + .1364 (Race) + .0326 (Education) + .0294 (Experience)

t-ratio (3.81) (6.69) (10.14)

$- .0006 (\text{Experience})^2$

t-ratio (-9.50)

2. $\bar{R}^2 = .14$

.3919 + .1385 (Race) + .0476 (Education) + .0392 (Experience)

t-ratio (3.87) (4.44) (5.67)

$- .0006 (\text{Experience})^2 - .0006$ (Education) (Experience)

t-ratio (-9.00) (-1.59)

(Table 1 - Continued - Page 3)

Full-Time Workers

c. Female, Standard Schedule

1. $\bar{R}^2 = .25$

Log hourly wages = -.2450 + .1256 (Race) + .0776 (Education) + .0164 (Experience)

t-ratio (5.52) (27.72) (9.73)

- .0003 (Experience)^2

t-ratio (7.50)

2. $\bar{R}^2 = .25$

Log hourly wages = -.5977 + .1322 (Race) + .1009 (Education) + .0334 (Experience)

t-ratio (5.83) (19.18) (9.11)

-.0004 (Experience)^2 - .0010 (Education)(Experience)^2

t-ratio (-9.75) (5.21)

(Table 1 - Continued - Page 4)

Full-Time Workers

d. Female, Shift Work

1. $\bar{R}^2 = .17$

Log hourly wages = -.1859 + .0037 (Race) + .0768 (Education) + .0204 (Experience)

t-ratio (.06) (7.16) (3.74)

- .0004 (Experience)^2

t-ratio (-3.82)

2. $\bar{R}^2 = .17$

Log hourly wages = -.2783 + .0045 (Race) + .0834 (Education) + .0243 (Experience)

t-ratio (.08) (3.53) (1.81)

- .0004 (Experience)^2 - .0002 (Education)(Experience)^2

t-ratio (-3.38) (-.31)

(Table 1 - Continued - Page 5)

Part-Time Workers

e. Male

1. $\bar{R}^2 = .21$

Log hourly wages = -.3648 + .0470 (Race) + .0738 (Education) + .0334 (Experience)

t-ratio (.55) (7.68) (5.22)

- .0005 (Experience)^2

t-ratio (-3.54)

2. $\bar{R}^2 = .27$

Log hourly wages = -.9468 + .1618 (Race) + .1098 (Education) + .0783 (Experience)

t-ratio (1.92) (10.00) (8.17)

- .0008 (Experience)^2 - .0026 (Education) (Experience)

t-ratio (-6.00) (-6.17)

(Table 1 - Continued - Page 6)

Part-Time Workers

f. Female, Away in Afternoon

1. $\overline{R}^2 = .31$

Log hourly wages = -.9054 + .0075 (Race) + .1104 (Education) + .0273 (Experience)

t-ratio (.12) (13.78) (9.44)

$- .0004 (Experience)^2$

t-ratio (-7.33)

2. $\overline{R}^2 = .34$

Log hourly wages = -1.5959 + .1122 (Race) + .1550 (Education) + .0623 (Experience)

t-ratio (1.72) (13.52) (8.73)

$- .0006 (Experience)^2 - .0024 (Education)(Experience)$

t-ratio (-8.57) (-5.34)

67a

67B

(Table 1 - Continued - Page 7)

Part-Time Workers

g. Female, Home in Afternoon

1. $\bar{R}^2 = .17$

Log hourly wages = -.7832 - .0484 (Race) + .0955 (Education) + .0362 (Experience)

t-ratio (-.34) (5.34) (5.27)

- .0006 (Experience)^2

t-ratio (-4.14)

2. $\bar{R}^2 = .18$

Log hourly wages = -1.4776 + .0527 (Race) + .1400 (Education) + .0695 (Experience)

t-ratio (.36) (5.62) (4.70)

- .0007 (Experience)^2 - .0022 (Education) (Experience)

t-ratio (-4.80) (-2.52)

TABLE 2

Actual and Estimated Earnings Per Hour

	Actual Earnings Per Hour	Estimated Earnings Per Hour (Using Male Full-Time Standard Schedule Coefficients)	Estimated Earnings Per Hour (Using Female Full-Time Standard Schedule Coefficients)
Male, Full-Time Standard Schedule	$ 4.31	--	
Shift Work	3.99	$ 3.99	
Male, Part-Time	2.09	3.11	
Female, Full-Time Standard Schedule	$ 2.87	$ 4.25	-
Shift Work	2.50	3.95	$ 2.63
Female, Part-Time Away in Afternoon	2.04	3.72	2.62
Home in Afternoon	2.05	3.90	2.65

2. Interaction Effects

a. Hypotheses About Possible Further Interaction Effects in the Basic Model

The basic empirical model in equation 1 was next expanded to consider some more complex hypotheses about the market for part-timers: to explore the possibility that the independent variables in that equation interact in determining wages.[1] The model in equation 1 assumes constant relative returns from each successive level of schooling, yet it is possible that additional levels will have somewhat different relative effects (for example, that finishing college will yield a different percentage gain in earnings than will finishing high school). The direction of this interaction effect -- i.e., of the effect of additional education on the marginal return to still further schooling -- will in general depend upon the available supply and demand for manpower at different levels of education (i.e., on the market for college graduates, high school graduates, and high school dropouts) in the year in which the survey was taken. However, one would predict that increasing returns to education would be less likely, in general, for part-timers, or for full-time shift workers, than for full-time standard schedule workers. It is plausible to expect that high levels of education may serve some full-timers as a way of embarking upon an upwardly mobile career in business or the professions, that will take them to the top of the earnings distribution. But education would more likely serve the part-timer simply as a ticket of admission into entry level employment, making increasing returns to schooling rather unlikely for this group.

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[1] The interactions discussed in this section are, of course, those that extend beyond the interactions implied in equation (1).

Years of schooling and years of education are also likely to affect percentage gains in earnings in an interactive fashion. If employers tended to regard prior experience and education at least partially as substitutes in evaluating an employee, or prospective employee (so that an above standard level of education could substitute for a below standard level of experience and vice versa) one would be more likely to expect a negative interaction here. On the other hand, if the job market were one in which education and experience were not good substitutes, so that one had to have high levels of <u>both</u> in fairly rigid proportions in order to progress in one's career, then a positive interaction might be more likely to be observed. If one hypothesizes that the difficulties part-timers face in being hired for well-paid employment can often be overcome either through education or experience, and if one further expects that part-timers will be barred from upward mobility paths which require both experience and education, strong negative education-experience interaction would be more likely for part-time earnings.

b. Empirical Findings on Further Interaction Effects

These hypotheses were tested empirically by expanding the model in equation (1).

$$\text{Log hourly wages} = a + b(\text{Race}) + c(\text{Education}) + d(\text{Experience}) - e(\text{Experience})^2 + f(\text{Education})^2 + g(\text{Education})(\text{Experience})$$

The value of the f coefficient would provide a guide to the effect of education on the payoff to further education. The estimate of the g coefficient would indicate whether there are positive or negative interactions between experience and education in determining percentage increases in earnings.

Education squared was insignificant in all of the regressions for part-timers.[1] Hence, an alternative form

$$(2)\quad \text{Log hourly wages} = a + b(\text{Race}) + c(\text{Education}) + d(\text{Experience}) - e(\text{Experience})^2 + f(\text{Education})(\text{Experience})$$

was also estimated. These results from this estimation are given in equations 2 of Table 1.

The results in equations 2 confirm the findings of equations 1 on the overall effects of experience and education on earnings. In equations 2, as in equations 1, the simple or gross education and experience coefficients (c and d, respectively) themselves are generally large and statistically significant for part-timers.

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[1] The absolute values of the t-ratios ranged from .12 to .78.

Moreover, an attempt was made to make the estimates of experience and education effects in the two equation sets more comparable by examining net coefficient values at the means of the data.[1] Thus, the education coefficient c in equations 1 was compared with $c + f(\overline{\text{Experience}})$, where the bar denotes mean values.[2] (This makes the two estimates comparable since, in equations 2, an increase in education of one year will, because of the interaction term, yield an increase of $c + f(\text{Experience})$ in the logarithm of hourly wages.) Similar adjustments were made in the experience coefficients: $d - 2e(\overline{\text{Experience}})$ in equations 1 was compared with $d - 2e(\overline{\text{Experience}}) + f(\overline{\text{Education}})$ in equations 2.

The conclusion in section 1.b, based upon what we are here terming gross coefficients, that experience and education payoffs are about the same for part-timers as for full-timers is replicated when net coefficients are used for comparison. Moreover, the coefficients of the interaction terms themselves (education times experience) tend to support the hypotheses advanced above.[3]

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[1] I.e., the partial derivative of log hourly wages with respect to different independent variables. In equation (1),

$$\frac{\partial(\text{Log hourly wages})}{\partial(\text{Education})} = c\,, \quad \frac{\partial(\text{Log hourly wages})}{\partial(\text{Experience})} = d - 2e(\text{Experience})\,;$$

in equation (2),

$$\frac{\partial(\text{Log hourly wages})}{\partial(\text{Education})} = c + f(\text{Experience})\,,$$

$$\frac{\partial(\text{Log hourly wages})}{\partial(\text{Experience})} = d - 2e(\text{Experience}) + f(\text{Education})\,.$$

[2] Means of standard schedule, full-time workers were used.

[3] When the education squared variable was used, the point estimates of the coefficient of this variable were consistently lower for part-timers. This would be consistent with the view that the best jobs, requiring a high level of education, are not available to part-timers.

Negative interaction effects between experience and education are observed for all the subgroups in equations 2.[1] However, these coefficients are much larger for part-timers than for full-timers. In part, this difference reflects the larger experience effects which are often observed for part-timers here -- but the part-time coefficients are still larger than those for full-timers, even when corrected for this factor (by dividing the f coefficient by the d coefficient in equations 2).[2] This result would be consistent with the hypothesis developed above -- that, as a result of employer attitudes towards hiring, training and promoting part-timers, education and experience are more likely to be substitutes, and less likely to be highly complementary, for part-timers.

Race

The introduction of these interaction terms brings out more clearly the role of race in determining the earnings of part-timers: the variable white is positive in all three of the part-time subgroups in equations 2, and is significant in two of them. A larger sample would be useful in determining whether there are generally strong effects of race on the earnings of part-timers.

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[1] These coefficients were insignificant for shift workers.

[2] The net part-time coefficients are much larger than the net male full-time coefficient, but only slightly greater in absolute value than the female full-time coefficients. The larger coefficients for female full-timers may reflect similarities between part-time, and female, full-time labor markets, including greater substitutability and less complementarity between education and experience.

3. Sectoral Influences on Individual Earnings

The models of wage determination in sections 1 and 2 only examine the influence of the individual's background characteristics on his hourly earnings. But the earnings level of the sector in which he finds employment may also have an independent influence on his wage. This influence can readily be integrated into the basic model presented in section 1. If the individual wage error term from equation (1) is w_{ij}, i.e., if

$$(3)\quad w_{ij} = \ln W_{ij} - a - b(\text{Race}_{ij}) - c(\text{Education}_{ij}) - d(\text{Experience}_{ij}) - e(\text{Experience}_{ij})^2$$

where j is the jth sector and i is the ith individual, w_{ij} can be thought of as a sum of two factors, a sector influence effect, v_j, and an individual random variation, u_{ij},

$$(4)\quad w_{ij} = v_j + u_{ij}$$

The regression model can then be rewritten as:

$$(5)\quad \ln W_{ij} = a + b(\text{Race}_{ij}) + c(\text{Education}_{ij}) + d(\text{Experience}_{ij}) + e(\text{Experience}_{ij})^2 + v_j + u_{ij}$$

A direct measure of v_j does not exist, but several indirect methods for incorporating sectoral influence are possible. The simplest is to use $\bar{W}_j$, the sectoral wage level itself.[1] However, this would be inappropriate,

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[1] As measured by the average wage in the sector. In addition to the disadvantages mentioned in the text, this measure will also be subject to the sample bias mentioned in the discussion below of the second alternative measure, $\hat{v}_j$.

inasmuch as the average wage will reflect differences among sectors in the average education, experience, sex, and race composition of the labor force employed there, as well as sector-specific factors that influence earnings.

The influence of intersectoral differences in background characteristics can be standardized for by taking sectoral averages of the residuals from the individual earnings functions estimated in section a: i.e., by measuring v_j as

$$(6) \quad \hat{v}_j = \sum_{i=1}^{n_j} \frac{\hat{w}_{ij}}{n_j}$$

where $\hat{w}_{ij}$ is an estimated value of w_{ij} (see equation (4)), and n_j is the number of cases in the jth sector.

The effect of $\hat{v}_j$ on the wage of part-timers was measured in several different ways; by simply adding it as a regressor variable to the wage equation for part-timers; by adding it as a regressor to an equation in which the coefficients of the background variables are constrained to those obtained in equations e-g in Table 1 (i.e., to that obtained by regressing the earnings of part-timers on their background characteristics); and by adding the variable to a regression in which the coefficients of the background variables are constrained to those obtained in equations a and c in Table 1 (i.e., to that obtained by regressing the earnings of full-time, standard shift workers against their background characteristics).

Adjusted coefficients of determination, $\bar{R}^2$, from these regressions are presented in Table 3. Row a gives the results obtained with background variables alone (repeating the presentation in Table 1). Rows b-d give the $\bar{R}^2$ found when $\hat{v}_j$ is used to measure sectoral influence. When this

sectoral influence variable is employed, $\bar{R}^2$ rises from .21 to .31 for male part-timers; from .17 to .30-.33 for female part-timers, home-in-the-afternoon; and from .31 to .50-.53 for female part-timers, away-in-the-afternoon.

However, the use of $\hat{v}_j$ as a proxy for v_j may yield biased estimates of the importance of sectoral influences. On the one hand, insofar as v_j and background characteristics are correlated, the use of $\hat{v}_j$ will minimize the measured influence of sectoral factors. By calculating v_j as a residual, the common variance in background characteristics and v_j is attributed to background characteristics. Many practitioners would defend this practice on the grounds that if access to higher paying sectors is correlated with higher educational attainment, then this should be considered as a return to education.

On the other hand, there are reasons for believing that the use of $\hat{v}_j$ will yield some upward bias in the correlation coefficient.

Combining equations (5) and (6), we obtain:

$$(7)\quad \hat{v}_j = \frac{\sum_{i=1}^{n_j} w_{ij}}{n_j} = \frac{\sum_{i=1}^{n_j} (v_j + u_{ij})}{n_j} = v_j + \frac{\sum_{i=1}^{n_j} u_{ij}}{n_j} = v_j + \bar{u}_j$$

where $\bar{u}_j$ is the average value of u_{ij} for the jth sector in a

particular sample.[1] This error in the measurement of v_j will also lead to an error in the measurement of R_{w_{ij}, v_j}. Abstracting from differences in the number of workers in each sector (i.e., writing n_j as n), it can be shown that for large samples:[2]

$$(8) \quad \frac{R_{\hat{v}_j, w_{ij}}}{R_{v_j, w_{ij}}} \simeq \sqrt{1 + \frac{1}{n} \frac{\sigma^2_{u_{ij}}}{\sigma^2_{v_j}}}$$

For a very large n, $R_{\hat{v}_j, w_{ij}} \simeq R_{v_j, w_{ij}}$. Otherwise, an upward bias is obtained in the measure of correlation.

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[1] An additional source of bias is introduced insofar as $\hat{w}_{ij} \neq w_{ij}$ -- i.e., insofar as sampling variations yield inaccurate measures of the coefficients in equations 1, and hence in the measure of the residual. This type of error will decline with the size of the total sample, not the size of the sample in each sector -- an important distinction when a large sample is divided into many sectors, as in the present case. However, this error will contribute to the measurement bias in $\hat{v}_j$, discussed in the text.

[2] For this relationship to hold exactly the covariance between u and v in the sample would have to equal zero. From (4) and (7) it follows that

$$\frac{R_{\hat{v}_j, w_{ij}}}{R_{v_j, w_{ij}}} = \frac{\text{covar}(\hat{v}, w)}{\text{covar}(v, w)} \frac{\sigma_v}{\sigma_{\hat{v}}}$$

can be rewritten as

$$\left[\frac{\sigma^2_v + \frac{\sigma^2_u}{n} + \left(1 + \frac{1}{n}\right) \text{covar}(u,v)}{\sigma^2_v + \text{covar}(u,v)} \right] \sqrt{\frac{\sigma^2_v}{\sigma^2_v + \frac{\sigma^2_u}{n} + \frac{\text{covar}(u,v)}{n}}}$$

The expected value of uv is zero. If $\text{covar}(u,v) \simeq 0$ in the sample, we obtain the result in the text.

The proxy variable method provides still another way of estimating the effect of sectoral influences on individual earnings. This technique can be employed by first regressing the observed sectoral residuals ($\hat{v}_j$) on a set of exogenous variables, which can predict the residual. Then, the predicted level of the sectoral residual (z_j) is substituted for the actual (v_j or $\hat{v}_j$) in the regression in which individual earnings are regressed upon background characteristics and sectoral influences. This method yields consistent estimates of the influence of the sectoral variation factor. However, it will yield correlation results that have a <u>downward</u> bias. If $v_j = z_j + t_j$, where z_j is the predicted level of v_j, and t_j represents deviations from this prediction, it can be shown that for large samples:[1]

$$(9) \quad \frac{R_{z,w}}{R_{v,w}} \simeq \sqrt{\frac{\sigma_z^2}{\sigma_z^2 + \sigma_t^2}}$$

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[1] For this relationship to hold exactly the covariance between u, z, and t in the sample would have to equal zero. From $v_j = z_j + t_j$ and (4), it follows that

$$\frac{R_{z,w}}{R_{v,w}} = \frac{\text{covar}(z,w)}{\text{covar}(v,w)} \frac{\sigma_v}{\sigma_z}$$

can be rewritten as

$$\frac{\sigma_z^2 + \text{covar}(z,t) + \text{covar}(u,z)}{\sigma_z^2 + 2\,\text{covar}(z,t) + \text{covar}(u,z) + \text{covar}(u,t) + \sigma_t^2} \sqrt{\frac{\sigma_z^2 + 2\,\text{covar}(t,z) + \sigma_t^2}{\sigma_z^2}}$$

The expected values of the covariances among u, z and t are zero. If they are approximately equal to zero in the sample, we obtain the result in the text.

which will be less than unity where z_j is an imperfect predictor of v_j (i.e., where $\sigma_t^2 > 0$).

As a result of the work described in the next section (see especially C.3.d, Prediction), a measure of z_j was available.

z_j was used in place of v_j in two equations; in each, individual earnings were regressed on z_j and on background characteristics. In the first equation, the coefficients of background variables are constrained to those obtained from the regression of part-time earnings on background variables. In the second, they are constrained to values obtained from the regression of full-time earnings on background variables. The adjusted coefficients of determination, $\bar{R}^2$, obtained from these regressions are given in rows e and f, respectively. As expected, the $\bar{R}^2$'s are lower than those obtained by using the observed sector residual, $\hat{v}_j$, but they are higher than the value obtained with background characteristics alone.

Equally important, the t ratios for the z variable in these six regressions range from 4.69 to 11.66, indicating the statistical significance of this sectoral influence variable in determining the earnings of individual part-timers.

In summary, even when very strict tests of the role of sectoral influences on the individual earnings of part-timers are employed, it is obvious that sectoral factors, as well as background characteristics, are important. The next section presents an explicit analysis of the determination of the sectoral factors influencing part-time employment and wages.

TABLE 3

Sectoral Influences on the Earnings of Individual Part-Timers

	Coefficients of Determination (adjusted) Obtained for: Males	Females: Away in Afternoon	Females: Home in Afternoon	Variable Sets Used in the Regression
a.	.21	.31	.17	Individual characteristics*
b.	.37	.53	.33	Individual characteristics, sector wage residual (w_j)
c.	.37	.53	.33	Individual characteristics weighted by part-time regression results, sector wage residual (w_j)
d.	.37	.51	.30	Individual characteristics weighted by full-time regression results, sector wage residual (w_j)
e.	.25	.43	.24	Individual characteristics weighted by part-time regression results, estimate of sector wage residual (z_j)
f.	.24	.41	.22	Individual characteristics weighted by full-time regression results, estimate of sector wage residual (z_j)

* Race, education, experience, experience squared.

C. Cross-Sectional Differences in the Employment and Earnings of Part-Time Workers

1. Introduction

As we have seen, a significant portion of the difference in earnings among part-timers derives from variation in the relative supply of and demand for part-timers among different sectors of the economy. An analysis of sectoral variations is also useful in studying in greater depth factors responsible for differences in earnings between full and part-timers.

Further, an analysis of intersectoral variations can also provide information both on opportunities for the employment of part-timers and on the potential supply of part-time labor. It can be especially helpful in understanding the extent to which utilization of part-timers can be increased as supply is augmented, or as other factors change.

2. Hypotheses About the Demand for and Supply of Part-Time Employees

The qualitative analysis of the utilization of part-timers in different sectors in section II suggests a number of hypotheses that can be tested with cross-sectional data. It will be assumed here that one can develop such testable hypotheses in the context of the traditional neoclassical model -- the "conventional wisdom" in present day economics -- which would in this application predict that the distribution of part-timers over industries and occupations will be a function of both employee supply and employer demand factors. It is, of course, understood that employers determine whether jobs shall be filled by part-timers or full-timers. But employers can be influenced in their decisions by the relative availability of workers interested in part-time work, in their sector.

1. Turning first to employee, or supply-side factors, one would predict that demographic characteristics are likely to influence the employee demand for part-time work (a supply characteristic from the perspective of the employer). Essentially, those employees with alternative income sources; with non-market work responsibilities; or with physical limitations, are most likely to want to work part-time (see section II C above). Another source of supply of part-time job seekers are the moonlighters, who use part-time work to extend their work day (and hence are not "part-timers" in the definition used here). The characteristics of this group are the reverse of those of the voluntary part-timers (see section II B above). However, since moonlighters constitute only between twenty and twenty-five percent of all part-time job holders, demographic characteristics favorable to the supply of ordinary part-timers are likely to be more important in determining differences in the supply of part-time job seekers.

More specifically, one would expect that married men in the 25-50 year age group are least likely to want part-time work, since they generally want the higher incomes associated with full-time work. On the other hand, married women with school or pre-school age children are most likely to want part-time work, inasmuch as a full-time job will require either too many hours of work, or hours at the wrong time of day. Young, single people (males and females), will also tend to prefer part-time work, since many are students, and others are living at home, with only a minor need for income. Older workers will also tend to prefer part-time employment as a result of a pension, a disability, or both.

2. Some sectors of the economy will have a large proportion of workers with demographic characteristics which are favorable to part-time work (mothers, young people, etc.). Demographic composition varies among sectors because of the nature of the work and, perhaps, because of traditions, or of past discriminatory practices against women and others. Where the demographic composition is favorable, employers might be encouraged to set up part-time schedules, at least if this offered the prospect of obtaining labor more cheaply.

3. On the other hand, employees would be encouraged to take part-time jobs, over full-time jobs, if the relative wage of part-timers was high.

4. Employers would be likely to prefer part-time work schedules where there is a job-related need for it. Actually, each sector of the economy has its own special needs and problems. However, the discussion in sections II D and II E above, of employer usage of part-time workers, suggest some more specific hypotheses. Because of the importance of the problem of matching job times and job needs, and the possibility of substituting part-timers for full-time, nonstandard shift workers, one would expect there to be a systematically positive correlation among sectors between usage of part-time work and shift work (using that term to denote any nonstandard, full-time schedule). Part-timers may be useful in all those work activities which extend for a period of time each day (or week) that is not bounded by the standard eight-hour day, or some multiple thereof (or the forty-hour week or some multiple). Part-timers are also especially useful in those activities in which the demand

for employees varies over the day or week. Here, the need for part-time employees is generated during the "busy" period. In each of these situations, employers may seek part-timers who will put in hours at a time of day or evening which meet the employer's needs.

In most of these situations the employer has the alternative option of hiring a "shift worker" (a full-timer whose hours are scheduled at non-standard times). The substitution of part-timers and shift workers is quite common in those sectors which offer services to the public. The retail trade sector and most other industries in the service sector, including the health, security, restaurant, leisure, repair and education industries provide numerous examples of this type of schedule structure (see section II E above).

However, a different structure is observed when an industry is producing a good for inventory or stock, for two reasons. First, there is less need for systematically irregular hours to meet demands. Where there is variation, this is likely to be less systematic -- difficult to forecast and short-term in nature. Hence, variations are likely to be met by overtime work, or involuntary part-time employment, for the full-time labor force, rather than by hiring part-timers.

Second, where shift work is used in these sectors, it is for quite different reasons: for example, to obtain better utilization of capital stock -- minimizing workplace costs per worker -- or to maintain a continuous process in an industry. Mining and manufacturing are examples of this type of industry. (In practice, one must also add railroads: railroads do not produce for stock, but do have similar problems of maintaining usage of rolling stock.) One would not expect a positive correlation between shift work and part-time employment in these sectors (see section II D).

5. Part-timers are likely to be underrepresented in those sectors where the wage of full-time workers (adjusted for individual background characteristics) is high. One would expect that wages will be high in those sectors where training and promotion opportunities permit individuals to improve their economic position, beyond the average for their education level. But, one would also expect that part-timers will tend to be excluded from just this type of opportunity. Moreover, it is expected that these sectors would heavily overlap with what dual labor market theorists call "primary labor markets." Insofar as these large organizations are characterized by complex supervisory pyramids and intricate communications networks, the greater supervisory, coordination, and communication problems imposed by the use of part-timers might also limit their use here. Hence, one should expect a negative relationship between the employment of part-timers, and (quality-adjusted) full-time wage rates (see section II D above).

6. While employers are generally expected to be susceptible to relative price differences, the degree to which they will make an adjustment in the part-time/full-time ratio will vary. In some sectors, where technical considerations reduce the usefulness of part-timers to a negligible level, one would expect relatively little adjustment to price differences (continuous shift plants would provide an extreme example, but many others could be cited in this sector). A higher degree of responsiveness would be expected in the white collar and service sectors.

One might also predict that where labor is relatively expensive, more attention would be paid to labor costs, and bureaucratic opposition to considering part-timers (where it exists) would be more readily overcome. Hence, a greater price sensitivity could also be forecast here.

3. Empirical Evidence on Intersectoral Differences

a. The Data

The empirical data base used here is the same as that employed in section B -- the matched March-May, 1973 CPS sample. However, in order to study the intersectoral distribution of part-timers, a number of variables from the CPS tape were first aggregated by sector. Two hundred sectors were included (corresponding to the major industry and occupation subgroups of the U.S. census categories).

Hourly earnings were first adjusted for individual characteristics using the coefficients for race, education and experience in Table 1 (equations a.1 and c.1). Then the average, adjusted wage was calculated for each sector. Separate computations were made for full-timers and part-timers. The ratio of the number of part-time to the number of full-time workers was then obtained for each sector. In this calculation part-time moonlighters -- those holding a full-time and a part-time job -- were counted twice: as full-timers in the sector in which they worked full-time, and as part-timers in the sector in which they worked part-time.

A number of demographic characteristics were similarly aggregated by sector: the proportion of workers under twenty-five years of age or over fifty years of age; of women with children under fifteen years of age; of other married women; of single females; of other women; and of single males.

A part-time job need variable was constructed, equal to the proportion of shift workers, except in the mining, manufacturing and railroad industries.

b. Cross-Tabulation Results

The data in Tables 4-6 tend to support several of the hypotheses in section 2. Table 4a gives the distribution of different demographic groups over types of jobs (including full-time, standard hours; full-time shift work; part-time moonlighter; and voluntary part-timer, home-in-the-afternoon and away-in-the-afternoon).[1] Table 4b shows the proportion of the part and full-time labor forces with different demographic characteristics.

These results support the first hypothesis, in that the demographic groups expected to desire part-time employment in fact are more likely to have such jobs. For example, married males are a small proportion of part-time only job holders, but constitute a very large proportion of moonlighting part-timers. Overall, though, their share of part-time jobs is small. The results for other groups also confirm theoretical expectations.

Table 5 tends to support the second hypothesis. This table shows the proportion of part-timers in the sector of the economy in which the average member of a particular demographic group is employed. For example, in column 2, the average full-time married male has eleven percent part-timers in the sector in which he works, while the average mother with children under fifteen, employed full-time, has nineteen percent part-timers in her sector.

The results in column 2 are thus consistent with the hypotheses that employers do tend to create part-time jobs where the demographic factors

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[1] Table 4 is based upon individual data. Tables 5 and 6 are based upon data aggregated by sector.

TABLE 4a

Distribution of Demographic Groups Over Types of Employment[1]

	N	All	Voluntary Part-Timer			Part-Time Moonlighter (One Part-Time, One Full-Time Job)	Full-Timer		
				Home in the Afternoon	Away in the Afternoon			Standard Schedule	Shift Worker
All		100%	12.91%	3.44%	9.45%	3.83%	81.22%	69.38%	11.85%
Married Men	6519	100	2.43	.72	1.72	6.20	89.72	75.81	13.91
Single Men	1604	100	25.56	4.36	21.20	2.00	70.40	56.30	14.10
Single Females	458	100	25.23	6.61	18.62	1.82	69.92	60.94	8.98
Other Females	301	100	16.74	4.84	11.90	1.78	79.59	72.36	7.23
Females with Children Under 15 Years of Age	374	100	25.79	9.03	16.76	.34	71.24	61.79	9.45
Young Males	1572	100	25.89	4.39	21.50	2.93	66.28	53.31	12.97
Prime-Age Males	4630	100	1.33	.32	1.01	6.67	89.89	75.14	14.75
Older Males	1989	100	5.03	1.66	3.37	4.08	89.19	76.82	12.36
Young Females	1187	100	33.03	7.25	25.78	1.68	64.45	57.54	6.91
Prime-Age Females	2568	100	18.69	6.58	12.11	1.21	78.58	69.86	8.72
Older Females	1240	100	21.06	6.69	14.35	1.53	76.61	66.61	10.00

[1]Percentages do not add up to one-hundred since involuntary part-timers (and those few workers who have two full-time jobs) are excluded.

TABLE 4b

Distribution of Types of Employment Over Demographic Groups

	All	Voluntary Part-Timer			Involuntary Part-Timer	Part-Time Moonlighter (One Part-Time, One Full-Time Job)	Full-Timer		
			Home in the Afternoon	Away in the Afternoon				Standard Schedule	Shift Worker
All	100%	100%	100%	100%	100%	100%	100%	100%	100%
Married Men	49.4	9.6	10.3	8.9	33.2	79.9	56.0	54.0	58.0
Single Men	12.2	21.3	15.4	27.2	12.1	6.3	12.1	9.8	14.4
Single Females	13.8	26.8	26.5	27.1	23.3	6.6	11.4	12.1	10.6
Other Females	13.6	18.1	19.1	17.1	14.8	6.3	11.2	14.0	8.4
Females with Children Under 15 Years of Age	11.0	24.2	28.8	19.5	16.6	1.0	9.3	9.7	8.8
Young Males	11.9	21.1	15.1	27.1	17.0	4.6	11.2	9.2	13.1
Prime-Age Males	35.1	3.5	3.3	3.7	18.8	30.6	40.8	38.0	43.7
Older Males	15.1	6.4	7.3	5.4	9.4	8.0	16.2	16.7	15.7
Young Females	9.0	21.8	18.9	24.6	16.1	2.0	6.4	7.5	5.3
Prime-Age Females	19.5	31.0	37.1	25.0	23.3	3.1	17.0	19.6	14.4
Older Females	9.4	16.2	18.2	14.3	15.2	1.9	8.4	9.0	7.9

TABLE 5

Average Proportion of Voluntary Part-Time Jobs in Sector by Demographic Composition and Type of Employment*

	Voluntary Part-Timer	Full-Timer
Married Males	.247	.110
Single Males	.357	.133
Other Single Females - No Children Under 15 Years	.375	.178
Single Females with Children Under 15 Years	.455	.186
Other Married Females - No Children Under 15 Years	.327	.163
Married Females with Children Under 15 Years	.301	.158
Young Persons - Under 25 Years	.380	.146
Prime-Age Persons - Between 25 and 50 Years	.295	.125
Older Persons - Over 50 Years	.338	.136

*Numbers in body of table are proportion of voluntary part-time employees in the sector where the average member of the specified group is employed.

of the labor force are favorable. (In fact, this is an exceptionally strict test of the hypothesis since if, when employers replace a full-time job with, say, two part-time jobs, these are given to full-timers with the expected demographic composition -- e.g., mothers or students -- this would reduce the proportion of remaining full-timers with such demographic characteristics. Hence, if employers acted randomly in deciding the proportion of part-time jobs in their sector, one would expect a negative correlation between the proportion of part-time and the demographic characteristics of the full-time labor force.)

A comparison of columns 1 and 2 of this table is also interesting. This comparison yields an index of the relative segregation of part-timers in the economy. The table shows that the proportion of part-timers in the sector in which the average part-timer finds himself is two to three times as high as is the proportion of part-timers in the sector in which the average full-timer is employed.

Table 6a similarly supports the fourth hypothesis. The average part-timer is in a sector in which the mean value of the need for part-timer variable is .18, about twice as high as the level of that variable in the sector in which the average full-timer is employed.

The data in Table 6b tend to support the fifth hypothesis. In fact, they indicate that the wage of the average full-time employee in a sector in which a part-timer works is nineteen percent below that paid to the average full-time wage in the economy. Thus, the allocation of part-timer to sectors with low wages accounts for about two-thirds of the earnings gap between full and part-time employees.

TABLE 6a

Average Value of Part-Time Job Need Variable in Sector in Which Average Worker Was Employed

Part-Time Workers	.184
All Workers	.096

TABLE 6b

Average Value of Wage Residual (Quality-Adjusted Wage) in Sector in Which Average Part-Timer Was Employed

Wage of Part-Timers (Quality-Adjusted)	-29.0%
Wage of Full-Timers (Quality-Adjusted)	-19.2%

c. Regression Models and Results

Cross-tabulations thus permit a rough test of a number of the hypotheses in 2. A different, more sophisticated test of all these hypotheses is also possible, with the use of a supply-and-demand model of the part-time labor market (based upon neoclassical economic theory).

Cost minimization in the utilization of part and full-time labor implies that the ratio of the marginal products of the two types of labor equals the ratio of their prices. It is assumed that the production function relating part and full-time labor to output can be approximated by a constant elasticity of substitution form

$$(10)\quad O = \left[\alpha q_1^{-\beta} + (1-\alpha)q_2^{-\beta}\right]^{-\frac{1}{\beta}}$$

where O is output, q_1 is the quantity of part-time labor, q_2 the quantity of full-time labor, and the elasticity of substitution between part and full-time labor, $\sigma = \frac{1}{1+\beta}$. This elasticity of substitution measures the percentage change in the ratio of factor inputs per one percent change in the ratio of marginal products. Since the assumption of cost minimization implies that the ratio of marginal products equals the ratio of factor prices, the elasticity can equally be said to measure the percentage change in the ratio of factor inputs per one percent change in the ratio of factor prices. Thus, it follows from (2) that:

$$(11)\quad \ln(q_1/q_2) = \sigma\ln\left(\frac{\alpha}{1-\alpha}\right) - \sigma\ln(p_1/p_2)$$

where p_1/p_2 is the ratio of the (quality-adjusted) price of part-time labor to the (quality-adjusted) price of full-time labor. If we posit that α is a function of the sectoral wage level W (full-time wage adjusted for background characteristics), and of part-time job need, PTJND , then, linearizing the relationship for empirical work, and introducing an error term u , we obtain

$$(12) \quad \ln(q_1/q_2) = a + b\,PTJND + cW + d\ln(p_1/p_2) + u$$

where d is equal to $-\sigma$, as our empirical demand function.

If the relative supply of part-time labor is a function of the demographic composition of the sector, and the relative wage of part-timers employed there, it would be appropriate to use an empirical supply function of the form:

$$(13) \quad \ln(q_1/q_2) = a + b\underline{S} + c\ln(p_1/p_2) + u$$

where $\underline{S}$ is a vector of demographic variables. (In the empirical work reported here, the proportion of young workers; old workers; single male workers; single female workers; mothers with children under 15 years of age; and other women were employed as demographic variables. The proportion of married males was excluded, as was the proportion of prime-aged workers, to avoid the problem of perfect multicollinearity.)

Equations (12) and (13) constitute a system with two endogenous variables, $\ln(q_1/q_2)$ and $\ln(p_1/p_2)$. Estimation by ordinary least squares here would thus be expected to yield inconsistent results. (In particular, it would tend to generate estimates of the supply price coefficient that were too low, and of the demand price coefficient that

were too high.) Hence, the system was estimated by the two-stage least squares regression method, which provides consistent estimates of the price coefficients. The results of the second stage estimation are presented in Table 8a (equations a and d); those obtained by estimating the equations by ordinary least squares are also given, to provide a comparison (Table 7).

These results in Table 8 tend to support the first five hypotheses. The expectation of a negative effect of training and of a positive effect of job need on the employer's relative demand for part-timers is strongly supported by the results obtained with the proxy variables used here. A high elasticity of demand is indicated by the coefficient of the relative price variable (the logarithm of the ratio of the quality-adjusted, part-time wage to the quality-adjusted, full-time wage); σ is measured over four.

In the supply equation, d , the price elasticity of supply is large and positive also (over four).[1] The set of demographic variables ($\underline{S}$) together make an important contribution to the regression,[2] although they are highly multicollinear, reducing their individual significance. Moreover, those coefficients which have relatively high measured t ratios have the expected signs.

A test can also be made of the sixth hypothesis, that the elasticity of substitution between part and full-time labor will be a positive

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[1]Note that, as expected, the supply elasticity has a lower algebraic value and the demand elasticity a higher value in the ordinary least squares regression estimates than in those obtained by the two-stage least squares regression.

[2]The adjusted coefficient of determination almost doubles when the demographic variables are added.

Definitions for Tables 7 and 8

Demand

LQR	Log (Number of part-timers/Number of full-timers)
LPR	Log ($\frac{\text{Part-time wage, adjusted}}{\text{Full-time wage, adjusted}}$)
ELPR	Estimated value of LPR
W	Log full-time wage, adjusted
PTJND	Part-time job need
INTW	ELPR·W
INTN	ELPR·PTJND

Supply

LQR	Log (Number of part-timers/Number of full-timers)
LPR	Log ($\frac{\text{Part-time wage, adjusted}}{\text{Full-time wage, adjusted}}$)
ELPR	Estimated value of LPR
Older	Proportion over 50 years of age
Young	Proportion over 25 years of age
Single Male	Proportion single male
Single Female	Proportion single female
Mothers	Proportion mothers with children under 15 years of age
Other Married Female	Proportion married women without children under 15 years of age

TABLE 7

Demand and Supply of Part-Time Employees

Ordinary Least Squares Estimates

Demand

a. $\bar{R}^2 = .48$

LQR = -2.6364 - 3.6132 W + 4.0055 PTJND + .1813 LPR

t-ratio (-7.46) (6.29) (.45)

Supply

b. $\bar{R}^2 = .51$

LQR = -4.2440 + .8776 OLDER + .3497 YOUNG + 7.1818 SINGLE MALE + 6.2559 SINGLE FEMALE

t-ratio (.74) (.21) (3.85) (3.81)

- .4641 OTHER MARRIED FEMALES + 1.5947 MOTHERS + .7566 LPR

t-ratio (-.31) (.86) (1.92)

TABLE 8a

Demand and Supply of Part-Time Employees

Two-Stage Least Squares Estimates

		Demand					Standard Error of Estimates
a.	LQR =	-3.2697 - 5.0806 W	+ 3.9928 PTJND	- 4.1610 ELPR			1.26
	t-ratio	(-6.61)	(5.22)	(-2.68)			
b.	LQR =	-3.4990 - 5.3364 W	+ 4.2890 PTJND	- 5.2767 ELPR	- 5.6780 INTW		1.31
	t-ratio	(-6.58)	(5.28)	(-3.04)	(-1.75)		
c.	LQR =	-3.3768 - 5.2593 W	+ 3.5756 PTJND	- 4.4006 ELPR	- 5.6710 INTW		1.26
	t-ratio	(-6.63)	(2.68)	(-2.06)	(-1.81)		
		- 6.6089 INTN					
	t-ratio	(-.66)					
		Supply					
d.	LQR =	-3.6226 - .2286 OLDER	- .5380 YOUNG	+ 9.2593 SINGLE MALE			1.14
	t-ratio	(-.16)	(-.28)	(4.17)			
		+ 4.0241 SINGLE FEMALE	+ .4256 OTHER MARRIED FEMALES				
	t- ratio	(2.01)	(.24)				
		+ 3.4771 MOTHERS	+ 4.6564 ELPR				
	t-ratio	(1.58)	(3.52)				

TABLE 8b

Demand and Supply of Part-Time Employees

Two-Stage Least Squares Estimates

(Excluding Mining, Railroads, and Manufacturing)

				Standard Error of Estimates
		Demand		
a.	LQR =	-2.7170 - 5.4959 W + 1.4775 PTJND - 5.4368 ELPR		1.00
	t-ratio	(-7.95) (2.14) (-3.73)		
		Supply		
b.	LQR =	-3.3171 + 1.6359 OLDER - .3623 YOUNG + 8.0633 SINGLE MALE		.92
	t-ratio	(1.24) (-.21) (4.02)		
		- 1.5977 SINGLE FEMALE - 2.0065 OTHER MARRIED FEMALES		
	t-ratio	(-.79) (-1.28)		
		+ 9.3716 MOTHERS + 4.1943 ELPR		
	t-ratio	(4.47) (3.36)		

function both of sectoral wage level and part-time job need. If we linearize this relation as:

$$(14a) \quad -\sigma = e + fW$$

or as

$$(15a) \quad -\sigma = e + fW + gPTJND$$

and substitute in the demand equation, we obtain

$$(16a) \quad \ln(q_1/q_2) = a + bW + cPTJND - e\ln(p_1/p_2) - f\ln(p_1/p_2)(W) + u$$

$$(16b) \quad \ln(q_1/q_2) = a + bW + cPTJND - e\ln(p_1/p_2) - f\ln(p_1/p_2)(W) - g\ln(p_1/p_2)PTJND + u$$

respectively.

The results of estimating these equations are given in equations b and c of Table 8a. The signs of these interaction coefficients consistently support the hypotheses developed here. Moreover, still higher estimates of the elasticity of substitution are obtained when σ is measured here as indicated by equations (16a) and (16b) above (measuring W and PTJND at the means of the data); in each case σ is measured as equal to about five. However, multicollinearity reduces the significance of these coefficients, making it especially difficult to assess the importance of the job-need interaction coefficient.

An alternative method for assessing the effect of job need on the elasticity of substitution between part and full-time workers is to constrain the sample, excluding those sectors with minimal part-time job needs (mining, railroads, and manufacturing). If our hypotheses is correct and there is a positive relationship between part-time job need and the elasticity of substitution, a higher estimate of σ should

be observed in the restricted sample. The results are given in Table 8b.[1] As expected, the estimate of σ is higher here -- 5.4.[2]

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[1] A two-stage least squares regression was run. These results were obtained in the second stage of the estimation.

[2] When interaction terms were added in this equation, they were statistically insignificant.

d. Prediction

The exogenous variables employed in the intersectoral model predict wages and employment of part-timers fairly well. When the ratio of part to full-time employment is regressed on all the independent variables in the system (see Table 9, equation a), an adjusted coefficient of determination, $\bar{R}^2$ of .60 is obtained, indicating that about three-fifths of the variance in the dependent variable is associated with the variance in the independent variables.[1] When the manufacturing, mining and railroad sectors are excluded, the adjusted coefficient of determation, $\bar{R}^2$, rises to .69. The coefficients in these equations yield predictions that follow from the analysis of supply and demand in Table 8: other things equal, employment of part-timers is relatively high where wages of full-timers are low and where the part-time job need variable is high. The supply variables are intercorrelated here, making it difficult to measure their individual contribution, but where they are significant, their coefficients are of the expected sign.

In equation c, the wage of part-timers is regressed on the exogenous variables in logarithmic form. Here, about one-half of the variance in the dependent variable (PTW) is explained. As expected, higher wages of full-timers and greater need for part-timers both act to increase the wage of part-timers. On the other hand, factors that tend to increase the relative supply of part-time job seekers (especially the proportion of single males and the proportion of mothers with children under fifteen years of age in the sectoral labor force) tend to depress the wages of part-timers.

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[1] Or, more precisely, in the logarithms of these variables.

Prediction from the Demographic Composition of Full-Time Labor Force

It was argued in section b that an exceptionally strict test of the validity of the supply theory advanced here would be to determine whether the demographic composition of the full-time labor force could be used to predict the proportion of part-timers in a sector. (See above pp. 79-80.) The results of an effort to test this theory is offered in equations b and e of Table 9. The prediction values obtained here are almost as satisfactory as those obtained when the entire labor force is used. An adjusted coefficient of determination, $\bar{R}^2$, of .58 is obtained in equation b (compared to .63 in the earlier estimation, when the entire labor force was used). Using full-timers only yields an $\bar{R}^2$ of .63, when mining, manufacturing and railroads are excluded (compared to .69 when both part and full-timers are used). Moreover, the values of the individual regression coefficients are in most cases remarkably similar to those obtained when the demographic composition of the entire labor force is used for this prediction.

TABLE 9

Prediction of Sectoral Variations of Part-Time Employment and Wages

a. $\bar{R}^2 = .60$

LQR	=	-3.9506	+	3.3742 PTJND	-	1.4046 W	+	.2260 OLDER	+	.7333 YOUNG
t-ratio				(5.73)		(-2.37)		(.20)		(.49)
			+	3.6196 SINGLE MALE	+	4.4372 SINGLE FEMALE	+	1.8117 OTHER MARRIED FEMALES		
t-ratio				(2.04)		(2.79)		(1.28)		
			-	.5941 MOTHERS						
t-ratio				(-.35)						

b. $\bar{R}^2 = .58$

LQR	=	-3.7878	+	3.9558 PTJND	-	1.9756 W	+	.3270 FULL-TIME OLDER	-	.7872 FULL-TIME YOUNG
t-ratio				(6.66)		(-3.41)		(.32)		(-.62)
			+	4.2634 FULL-TIME SINGLE MALE	+	3.5848 FULL-TIME SINGLE FEMALE				
t-ratio				(2.66)		(2.79)				
			+	3.7853 FULL-TIME OTHER MARRIED FEMALES	-	1.7507 FULL-TIME MOTHERS				
t-ratio				(2.56)		(-1.20)				

(Table 9 - Continued - Page 2)

c. $\bar{R}^2$ = .49

LPI =	.0165	+	.1345 PTJND	+	.4761 W	-	.0954 OLDER	+ .1185 YOUNG
t-ratio			(1.51)		(4.60)		(-.46)	(.43)

-	.9622 SINGLE MALE	-	.0080 SINGLE FEMALE	+	.1581 OTHER MARRIED FEMALES
t-ratio	(-2.97)		(-.03)		(.66)

-	.5724 MOTHERS	
t-ratio	(-2.08)	

(Excluding Mining, Railroads, and Manufacturing)

d. $\bar{R}^2$ = .69

LQR =	-3.2536	+	.6534 PTJND	-	2.1930 W	+	1.2212 OLDER	+ .1870 YOUNG
t-ratio			(1.26)		(-4.46)		(1.26)	(.15)

+	3.9252 SINGLE MALE	-	1.6259 SINGLE FEMALE	-	1.2743 OTHER MARRIED FEMALES
t-ratio	(2.55)		(-1.11)		(-1.08)

+	6.8638 MOTHERS	
t-ratio	(4.50)	

(Table 9 - Continued - Page 3)

e. $\bar{R}^2 = .63$

LQR	=	-3.3003	+	1.2047 PTJND	-	2.5124 W	+	1.4837 FULL-TIME OLDER	+ .1170 FULL-TIME YOUNG
t- ratio				(2.15)		(-4.97)		(1.64)	(.10)
			+	3.9271 FULL-TIME SINGLE MALE			+	.1130 FULL-TIME SINGLE FEMALE	
t- ratio				(2.70)				(.10)	
			+	.5078 FULL-TIME OTHER MARRIED FEMALES			+	3.7336 FULL-TIME MOTHERS	
t-ratio				(.38)				(2.73)	

IV. Conclusions and Policy Implications

A. Conclusions

1. The role of part-time employment in providing moonlighting opportunities for prime-aged males, and its restriction otherwise to function as a means of offering work to more "marginal" groups in the labor force does tend to contradict the view that part-time employment is a portent of further hours reduction for majority group workers.

2. The high degree of responsiveness of employers to wage differences when establishing a part-time, full-time job ratio will certainly not allay the fears of those who see part-timers as taking jobs from members of the full-time labor force. However, one's final evaluation of this question must depend upon whether one believes that there will be enough jobs to accommodate both full and part-timers.

3. There is evidence that part-time job opportunities are created for "marginal" members of the labor force, thus facilitating their participation in economic activity. Not only are existing part-time job opportunities widely used by mothers, young people, and older workers, but there is some evidence that increases in the supply of such workers generate part-time job openings for them.

4. Probably the most interesting implications are found in the analysis of employers. There is evidence that employers do respond to changes in the demographic composition of the labor force by changing

the part-time, full-time ratio. There is also evidence that they are very responsive to changes in the ratio of part to full-time wage rates. Some support is found for the hypothesis that employers tend not to hire part-timers in the higher paying sectors, which typically require training and promotion. Moreover, while there is evidence here that employers do give better-educated, more experienced part-timers somewhat better job opportunities than would be offered to poorly-schooled beginners, the upward mobility of part-timers is limited by employer policies barring them from the best jobs.

As would be expected, employers make less use of part-timers in those sectors of the economy where the cost of work locations is high and technical interactions are important. They make wide use of part-timers where service on demand requirements show regular fluctuations over the day or week.

B. Policy Implications

It is difficult to derive policy implications when there is sustained high unemployment, and when the effects of various types of labor market policies on the rate of unemployment are a matter of controversy. Under these circumstances, detailed studies of a sector of the labor market, such as the present analysis of part-time workers, are more likely to yield specific information for the policymaker (who will make his own assumptions about effects of specific policies on unemployment, inflation, and so on) than they are to produce actual policy recommendations. It is in this spirit that the following policy implications are offered.

1. The part-time labor market serves a very useful purpose. It provides jobs for millions of Americans who might otherwise not find employment. At the same time, it enables employers to maintain services for the consumer's convenience at irregular hours, without either inconveniencing the full-time staff or increasing the employers' labor costs. Moreover, it can be argued that -- at least in times of tight labor market conditions -- the pool of part-time laborers enables the economy to generate a higher overall level of goods and services.

2. The part-time labor market is very diverse, making regulation by means of quotas a rather inefficient proposition. It has been suggested that each federal department hire a quota of part-timers. A similar provision has been adopted in the state government of Massachusetts. Some advocates of alternative work schedules would like to see such quotas imposed upon private industries. A cross-

sectional analysis demonstrates the inefficiency of this approach. There are sectors of the economy where part-timers play a critically important role. There are other sectors where part-timers can compete with full-timers if their quality and wage rates are attractive to the employer. And there are sectors in which technical requirements make the use of part-timers uneconomical.

3. In much of the part-time labor market, employers are quite responsive to changes in the relative wages of part-timers. If it were desired simply to increase (decrease) the proportion of part-timers in the labor force -- rather than to change the proportion in each sector, as in a quota program -- a reduction (increase) in the relative price of part-timers could readily achieve this goal. A reduction in the relative price of part-timers could be accomplished either directly through a job subsidy to the employer, or indirectly through changes in the structure of fringe benefits -- e.g., through changes in the way in which ERISA, OASDHI, and UI impact upon the employer's labor cost, when hiring part-timers.

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